

URBAN MOBILITY INTERNATIONAL AND INDIAN ACTIVITIES



**METRO NEWSLETTERS
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gathered by Dr. F. A. Wingler

METRO NEWSLETTERS **on Technologies for** **“URBAN MOBILITY AS A SERVICE”**

**PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND
REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN
MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT,
LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN,
COMMUTER-RAIL, MONORAIL, AERIAL ROPEWAY, BOTTOM
CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE
MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD
CARS**

**TRANSPORT TECHNOLOGIES AND ECONOMIC DEVELOPMENTS IN
MODERN URBAN/MEGAPOLIS ENVIROMENT**



Artist`s Impression of Light Metro “*METROLITE*” for Jammu and Srinagar

METRO Newsletter by Dr. F.A. Wingler

METRO 94, January 2020

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Metro Rail Projects in India – At a Glance; India

By Urban Transport News; Dec. 2019

Are you looking for updated Metro Rail Projects in India? Here you can find everything about all operational/under construction/approved/planned projects.

Key Information (Project Status)

- **Operational Metro Projects (including Monorail/Tram):** 701 km
- **Under Construction Metro Projects:** 805 km
- **Oldest Metro Rail Project:** Kolkata Metro
- **Largest Metro Rail Project:** Delhi Metro

Operational Metro Projects

City (State)	Network	Stations	Corridors	Start Date	Project Cost
Ahmedabad Metro Gujarat	6.5 km	6	1	Mar 4, 2019	
Bangalore Metro Karnataka	42.3 km	41	2	Oct 20, 2019	
<u>Chennai Metro</u> Tamil Nadu	45.0 km	32	2	Jun 29, 2015	
Delhi Metro NCR-Delhi	347.6 km	252	10	Dec 24, 2002	
Gurgaon Rapid Metro NCR (Haryana)	11.7 km	12	1	Nov 14, 2013	
<u>Hyderabad Metro</u> Telangana	56.5 km	50	2	Nov 29, 2017	
<u>Jaipur Metro</u> Rajasthan	9.6 km	9	1	Jun 3, 2015	
<u>Kochi Metro</u> Kerala	23.8 km	21	1	Jun 17,	

				2017	
<u>Kolkata Metro</u> West Bengal	27.3 km	24	1	Oct 24, 1984	
<u>Lucknow Metro</u> Uttar Pradesh	22.9 km	22	1	Sep 5, 2017	
<u>Mumbai Metro</u> Maharashtra	11.4 km	12	1	Jun 8, 2014	
<u>Mumbai Monorail</u> Maharashtra	19.5 km	17	1	Feb 2, 2014	
<u>Nagpur Metro</u> Maharashtra	13.5 km	11	1	Mar 7, 2019	
Noida Metro NCR-Uttar Pradesh	29.7 km	22	1	Jan 25, 2019	

Operational Tram Projects

City (State)	Network	Stations	Routes	Start Since	Project Cost
Kolkata Tram West Bengal	38.0 km	NA	8	1873	

Under Construction Metro Projects

City (State)	Network	Stations	Corridors	Deadline	Project Cost
Agra Metro Uttar Pradesh	29.4 km	30	2	2021	
<u>Ahmedabad Metro</u> Gujarat	33.53 km	#	2	2021	
Bangalore Metro Karnataka	80.0 km	#	1	2021	
<u>Bhopal Metro</u> Madhya Pradesh	28.0 km	#	1	2024	
<u>Chennai Metro</u> Tamil Nadu	118.9 km	#	1	2021	
Delhi Metro IV NCR (Delhi)	103.9 km	#	3	2023	
Hyderabad Metro Telangana	17.7 km	#	1	2020	
<u>Indore Metro</u> Madhya Pradesh	32.0 km	#	1	2024	
<u>Jaipur Metro</u> Rajasthan	2.3 km	2	1	2019	
<u>Kanpur Metro</u> Uttar Pradesh	32.4 km	1	1	2024	

<u>Kochi Metro</u> Kerala	2.0 km	2	1	2021	
Kochi Water Metro Kerala	# km	2	1	2021	
Kolkata Metro West Bengal	108.0 km	#	1	2021	
Mumbai Metro Maharashtra	171.0 km	#	3	2024	
Nagpur Metro Maharashtra	24.5 km	#	2	2023	
Nashik Metro Neo Maharashtra	32.2 km	#	2	2024	
Navi Mumbai Metro Maharashtra	11.1 km	11	1	2020	
Patna Metro Bihar	# km	#	2	2021	
Pune Metro Maharashtra	31.5 km	#	1	2021	

New/Approved/Expansion Metro Projects

City (State)	Network	Stations	Corridors	Deadline	Project Cost
Ahmedabad Metro II Gujarat	28.25 km	#	2	2024	
Dholera Metro Gujarat	100.0 km	#	2	2024	
Jaipur Metro II Rajasthan	23.8 km	#	1	2024	
Mumbai Metro Maharashtra	56.5 km	#	8	2024	
Meerut Metro Uttar Pradesh	35.0 km	#	1	2024	
Nagpur Metro II Maharashtra	48.3 km	#	1	2024	
Nagpur Broad Gauge Metro Maharashtra	# km	#	4	2024	
Pune Metro Maharashtra	23.3 km	#	1	2022	
Surat Metro Gujarat	40.35 km	38	2	2024	₹12120 crore
Thane Metro Maharashtra	29.0 km	#	1	2024	

Under Consideration Metro Projects

City (State)	Network	Stations	Corridors	Deadline	Project Details
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Gorakhpur Metro (Uttar Pradesh)	NA	#	1	2025	
Greater Noida Metro (Uttar Pradesh)	NA	#	2	2025	
Ghaziabad Metro (Uttar Pradesh)	NA	#	2	2025	
Gurgaon Metro (Haryana)	NA	#	2	2025	
Jammu Metro (Jammu & Kashmir)	NA	#	1	2024	
Srinagar Metro (Jammu & Kashmir)	NA	#	2	2024	
Surat Metro (Gujarat)	NA	#	2	2024	
Dehradun Metro (Uttarakhand)	NA	#	2	2024	
Varanasi Metro (Uttar Pradesh)	NA	#	2	2024	
Visakhapatnam Metro (Andhra Pradesh)	42.55 km	#	3	2024	

Chennai Metro plans '*METROLITE*' to run on Tambaram-Velachery Corridor; India

By Urban Transport News; 28/09/2019



New Delhi (Urban Transport News): The Chennai Metro Rail Limited (CMRL) recently conducted a feasibility study and made a presentation on the **Urban Light Rail** system 'Metrolite' in a meeting called by Ministry of Housing & Urban Affairs in New Delhi on Thursday. In a few years, the proposed Tambaram-Velachery Metro Corridor of Chennai Metro may have a '**METROLITE**'.

Chennai Metro has proposed 'Metrolite' on the new proposed metro corridor connecting Tambaram and Velachery to easing mobility for commuters along the route. The Tamil Nadu Government will soon conduct a feasibility study on the new route, that will recommend possible alignments to connect the two areas, the estimated cost of the project and other details.

A senior officials from CMRL said,

After that, a detailed project report will be readied to go ahead with the project. The Light Rail system will either be elevated or be constructed at-grade (though not on the road itself, but similar to a railway line). There is a possibility that the stretch may be linked to the Velachery MRTS as well. It is still in a very nascent stage, and we will finalise the routes and other finer details only after the feasibility study is complete.

Presently, light rail transit services, operated in many cities including Singapore, Sydney, Ottawa and San Francisco, will have a lower passenger capacity as compared to the Metro.

One of the reasons for considering 'Metrolite' – a light rail transit service, is that it is not as cost-intensive as the Metro. The Metrolite system needs less land to build, and it can cover areas, that may not be possible to link by the Metro Rail.

Explaining the need for 'Metrolite' system, another official said,

For instance, while it will take ₹ 200-250 crore and ₹ 400-500 crore to build one kilometre of an elevated and underground stretch of the Metro, it will cost only around ₹80-100 crore for Light Rail. It will also not need the same right of way, that the Metro does, and hence, it can be taken into narrower lanes and denser roads.

Another important reason for considering 'Metrolite' for Tambaram-Velachery stretch is that, unlike Metro, it can take tighter curves. "While a Metro cannot take very tight turns, the light rail can. The radius of curvature for a Metro may be about 100 m, but for Light Rail, it may be about 25-30 m", he added.

Chennai Metro to construct first 'METROLITE' Project of Tamil Nadu; India

By Urban Transport News; 14/11/2019



Chennai (Urban Transport News): In a meeting held on last Thursday, the Tamil Nadu government has decided to appoint Chennai Metro Rail Limited (CMRL) as Chief Consultant to construct State's first Light Metro Rail 'Metrolite', which will connect Velachery with Tambaram. A feasibility study of the project will commence shortly.

Unlike the Chennai Metro Phase-I project, nearly 15km long stretch of the Light Metro Rail system 'Metrolite' is planned to construct at grade level. This stretch will connect Velachery with Tambaram. No elevated or underground construction would be made on this stretch.

Explaining the plan, an official, who is well aware with the project, said:

Similar to phase I, phase I extension projects, the feasibility study too will be given to a private firm. This will begin in a few weeks and is likely to take about 6-8

months. The study will look at various route options for the stretch. After that, there will be discussions on which route works out to be the best after which the detailed project report will be prepared.

The Chennai Metro Rail Limited (CMRL) is also planning to connect the Light Metro Rail system 'Metrolite' with Pallikaranai, Medavakkam, Gowrivakkam and then subsequently East Tambaram so that the dense residential areas in the southern parts of the city may get good public transport connectivity.

According to the plan, the Light Rail system 'Metrolite' would be linked with Chennai Metro Rail Network at Velachery, so that commuters, who may want to switch systems and head to areas connected by this network, may be able to do so at ease.

One of the main reasons for choosing 'Metrolite' over the Metro Rail system, is that it would cost much less such as building one km of an elevated stretch of Metro will cost Rs. 200-250 crore and underground Rs. 500-550 crore. But 'Metrolite' may be built with Rs. 100 crore per km. Another benefit of Metrolite is that it can take tight turns and travel through dense and narrow stretches, unlike the Metro.

Like the Chennai Metro Rail Project, the Central Government and Tamil Nadu Government may provide equal funding support for the project.

Government approves first '*METROLITE*' on Kirti Nagar-Dwarka Sect. 25 Metro Corridor; India

By Anushka Khare; 12/10/2019



New Delhi (Urban Transport News): The Ministry of Housing & Urban Affairs (MoHUA) and Board of Delhi Metro Rail Corporation (DMRC) has approved the induction of first Light Urban Rail Transit system 'Metrolite' on a 19 km stretch between Kirti Nagar

and Dwarka Sector 25 Exhibition-cum-Convention Centre. The Kirti Nagar-Dwarka Sector 25 corridor will act as a feeder line for the Metro Rail network.

Sources said that discussions on the 'Metrolite' system on 21.7 km long Rithala-Narela metro corridor, which is part of Phase IV of Delhi Metro, would be held in the next board meeting of the Delhi Metro Rail Corporation (DMRC).

After approval from the DMRC board, the files will be sent to Central Cabinet as well as Delhi Government for final approval.

Secretary, Ministry of Housing & Urban Affairs, Durga Shankar Mishra said:

DMRC has approved the Metrolite corridor connecting Dwarka and Kirti Nagar. Now, the Delhi Government has to give its consent and send it to us for final approval. This will be sufficient to handle passenger traffic on the route. The Centre will provide financial assistance in the ratio of 50:50 on the lines of regular Metro Rail projects.

Commenting on the 'Metrolite' system, Union Minister for Housing & Urban Affairs, Hardeep Singh Puri said:

In my personal view, we should try new models such as Metrolite and Metro on Tyre where the footfall is less. These are less capital-intensive and serve the same purpose. Huge stations, as is the case with metro projects, need not be built. We have set up a committee to suggest the standards for Metro on Tyre.

According to DMRC officials, the DMRC has already started work on preparing detailed project reports (DPR) for the two metro corridors. A 19 km long Kirti Nagar-Dwarka Sector 25 corridor will start from Kirti Nagar interchange metro station (connecting the Blue and Green Lines) and end with Dwarka Sector 25 (will extend from Dwarka Sector 21) to connect the Airport Express Line.

The Rithala-Narela Metro Corridor, which is one of the six proposed metro corridors of Phase IV of Delhi Metro, is yet to be approved by the Central Government. This corridor will extend Delhi Metro's Red Line from Rithala.

The Government thinks that Rithala-Narela stretch has no heavy passenger traffic, hence the 'Metrolite' would be better suited on this.

Apart from Delhi Metro, NMRC and Chennai Metro are also proposed to have a Metrolite system in upcoming metro corridors.

MAHA METRO to Prepare DPR for *METRO NEO* for Warangal, Telangana; India

Telangana Government announces handing over Preparation of DPR to Metro Neo to Maha Metro.

By [Kanika Verma](#); 10/12/2019; Metro Rail News



The Hon. Minister for Municipal Administration & Urban Development, Govt. of Telangana, Shri. K T Rama Rao felicitating MAHA METRO MD Dr. Brijesh Dixit during the Meeting.

NAGPUR (Metro Rail News): [Maha Metro Nagpur](#) has been awarded consultancy for the **Metro Neo** project in Warangal, State of Telangana. This was announced after a high-power meeting held at Hyderabad by the Government of Telangana, yesterday (9th December 2019).

Thus Maha Metro's capability, experience and innovative solution in providing economical, safe, reliable **Rubber-Tire Metro** have been recognized not only within Maharashtra but also in other parts of India.

The first state other than Maharashtra, to recognize Maha Metro expertise in finding **cost-effective solution for Metro services**, thus, is Telangana State where presentation was made by Maha Metro team consisting of [MD Dr. Brijesh Dixit](#) and Director (Project) Shri Mahesh Kumar yesterday in presence of Hon Minister for Municipal Administration & Urban Development Hon Shri KT Rama Rao, elected representatives, Principal Secretary, Shri Arvind Kumar and other senior IAS officials of State of Telangana.

Thereafter Hon Minister requested Maha Metro to take up the assignment of preparation of [Detail Project Report \(DPR\)](#) for **Rubber Tire Metro** for Warangal district for a length of 10-15 km. It's a matter of great satisfaction that a cost-effective solution which is at a one-third cost as compared to the conventional system is being planned in Warangal district, other than Nasik district of Maharashtra state. The cost of the conventional Metro project being executed by other states is Rs.250 crore per km, while Maha Metro is executing the same project at Rs.180 crore per km. Metro Neo will cost just Rs.72 crore per km.

It may be recalled that a high-level delegation of elected representatives and officials from Telangana had visited the [Nagpur Metro project](#) last month (19th November) for the study of the Double Decker system and overall Metro Project work. The team held extensive discussions with Maha Metro officials, where the presentation was given followed by site visits. The team was quite impressed with the project and had sought Maha Metro help in building similar infrastructure work in Telangana state. Soon after Nagpur's visit, Maha

Metro team was invited by Telangana Chief Minister Shri K Chandrashekar Rao for a detail presentation on the innovative solution prepared by Maha Metro.

In a recent meeting held at Delhi by the Ministry of Housing and Urban Affairs (MoHUA), this cost-effective solution named '[Metro Neo](#)' was accepted for Tier-II and Tier-III cities of India. Even for Tier-I cities, it can be adopted as a feeder service. The model developed for Nasik was discussed on various forums and Government of India on 21st August 2019, constituted a committee under the chairmanship of Dr. Brijesh Dixit for standardization of detail specifications for [Rubber-Tyre Mass Rapid Transportation System \(MRTS\) with a view to implementing this across India](#). It may be recalled that the Government of Maharashtra has already entrusted the task of providing Metro Neo transport system for Nasik to Maha Metro.

Thus after successfully concluding DPR work for Thane and Metro Neo project for Nasik, Maha Metro has bagged yet another prestigious work in Telangana State. As part of the Metro Neo project, the length of Bus Coaches will be 25/18 meter with carrying capacity of 200/300 passengers. The buses run on rubber-tire and draw power from overhead electric wire having 600-750 V DC supply. The buses take power from overhead electric wire similar to the railway system.

With Warangal, Telangana Maha Metro has yet another feather in its cap. With the Nagpur project being executed successfully, this development is a big milestone for Maha Metro.

Bombardier's Driverless *CITYFLO 650* CBTC Solution starts Operation on Delhi Metro Line 9; India

By Anushka Khare; 11/10/2019; Urban Transport News



New Delhi (Urban Transport News): After the opening of the 4.29 km long Delhi Metro's Line-9 (Dwarka-Najafgarh section), Bombardier's CITYFLO 650 Communication Based Train Control (CBTC) solution started operation with the train.

Bombardier Transportation, along with Delhi Metro Rail Corporation Ltd (DMRC), celebrated the opening of the first section of Line 9 (Grey Line) on September 4. The trains being run in Grey Line are equipped with Bombardier's CITYFLO 650 Communication Based Train Control (CBTC) solution.

Grey Line of Delhi Metro is the latest addition to the city's metro rail network, connecting Dwarka to Najafgarh with the aims to ease congestion and improve travel times in the western part of the National capital.

After the opening of the section, SS Joshi, Director, Rolling Stock, Delhi Metro Rail Corporation, said:

The opening of Dwarka-Najafgarh stretch (Line 9) is another major milestone in the expansion of Delhi's metro system, which is significantly improving travel for commuters. I would like to thank the Bombardier Transportation team for their hard work and dedication in enabling us to successfully commission this latest line on the network.

KD Sharma, Chief Signal and Telecom Engineer of Delhi Metro Rail Corporation, also thanked and appreciated to Bombardier Transportation for successfully completing signalling works in Line-9 under very tight time constraints.

Rasmi Ranjan Ray, Head of Rail Control Solutions India for Bombardier Transportation said:

Bombardier Transportation and Delhi Metro Rail Corporation have been working together since 2007 to provide signalling and control systems on the Delhi Metro rail network. It is a proud moment to see the second fully automated line equipped with Bombardier's CITYFLO 650 rail control improving passenger experience in Delhi. We look forward to continuing to equip more upcoming lines with our advanced signalling to ensure safe and reliable travel for all.

Earlier in 2018 Bombardier's proven CITYFLO 650 CBTC solution has been started operating on 58.5 km long Delhi Metro's Shiv Vihar-Majlis Park corridor (Line 7), also called Pink Line, which now handles an average ridership of over 200,000 passengers per day.

According to the information shared by Bombardier Transportation, the opening of Delhi Metro's Line 9 brings the total of CITYFLO 650-equipped track in India to more than 60 km with a further 1.2 km stretch planned to open in 2020 which will also be equipped with the technology.

Bombardier is actively collaborating in the 'Make in India' initiative of Government by delivering rail vehicles, products and solutions, that are developed locally, for both Indian and foreign markets.

Bombardier Transportation has also been delivering rail control solutions in India for over 30 years, and is the largest signalling solution supplier for the Delhi Metro rail network. In

addition to the CITYFLO 650 operating on Line 7 and Line 9, Line 5 and Line 6 of Delhi Metro Rail network are equipped with Bombardier's CITYFLO 350 signalling solution.

Earlier this year, Bombardier Transportation signed a contract with Delhi Metro to supply another 40 **BOMBARDIER MOVIA** metro cars, bringing the number of cars on Delhi's metro lines to 816 – one of the world's largest Bombardier Transportation-built metro fleets.

Bengaluru Suburban Commuter Rail: Project Information, Tenders and Route Maps; India

The total Cost of Project is estimated to Rs.16,035 Crore.

By Urban Transport News; 31/07/2019



Bengaluru Suburban Rail also known as Bengaluru Commuter Rail is a proposed suburban rail service to connect various areas of the Bengaluru City. The proposed project will have 4 corridors covering a total network length of 148 km and will serve a total 57 stations. The total cost of project is estimated to Rs.16,035 crore. If everything done as per the plan, the project will be completed by 2026.

Project Summary

- **Project Name:** Bengaluru Suburban Rail Project
- **Project Owner:** Karnataka Rail Infrastructure Development Corporation Ltd (K-RIDE)
- **General Consultant:** RITES Limited
- **Project Cost:** Rs.16,035.00
- **No. of Corridors:** 4
- **Total Network Length:** 148 km
- **No. of Stations:** 57
- **Deadline:** 2026

Proposed Corridors

Corridor 1: KSR Bengaluru City – Devanahalli

- Total network length: 41.40 km
- Total stations proposed: 15 stations (8 elevated and 7 At grade)
- Land required: 12.10 hectares
- Ridership expected: 2.82 lakh

Corridor 2: Baiyyapanahalli Terminal – Chikkaba Navara

- Total network length: 25.0 km
- Total stations proposed: 14 stations (8 elevated and 6 At grade)
- Land required: 28.59 hectares
- Ridership expected: 2.03 lakh

Corridor 3: Kengeri – Whitefield

- Total network length: 35.52 km
- Total stations proposed: 9 stations (4 elevated and 5 At grade)
- Land required: 20.71 hectares
- Ridership expected: 1.64 lakh

Corridor 4: Heelalige – Rajankunte

- Total network length: 46.24 km
- Total stations proposed: 19 stations (4 elevated and 15 At grade)
- Land required: 40.28 hectares
- Ridership expected: 3.34 lakh

Project Cost

The project cost estimates has been prepared covering civil, electrical, signalling and telecommunications works, rolling stock etc. at the June 2019 price level. The total cost including private land and GST comes to Rs.16,035.10 crores. The break-up of the estimated project cost is as under:

- Land Cost and R&R: Rs.1,469.80 crore
- Infrastructure Cost: 9,882.80 crore
- Rolling Stock: Rs.1,998.00 crore

- Lifts & Escalators, Automatic Fare Collection, and Platform Screen Doors: Rs.841.4 crore
- State GST: Rs.861.6 crore
- Central GST & Basic Custom Duty: Rs.981.5 crore

Train Maintenance Depot and Workshop

The Bengaluru Suburban Rail project will have two depots for maintenance work.

- Devanahalli: This depot will serve corridor 1 (KSR Bengaluru City-Devanahalli)
- Jananabharathi: This depot will serve corridor 2 (Baiyyapanahalli Terminal-Chikkaba Navara), corridor 3 (Kengeri-Whitefield), and corridor 4 (Heelalige-Rajankunte)

Integration with the Bangalore Metro Stations

The state-owned consultancy firm RITEs has proposed the integration plan of Bengaluru Suburban Rail with the following 10 existing and proposed Metro stations of Bangalore Metro Rail network:

- Majestic
- Yeshwanthpur
- Kengeri
- Cantonment
- Whitefield
- KR Puram
- Baiyappanahalli
- Jnanabharathi, and
- Nayandahalli

RITEs submits revised DPR of Bengaluru Suburban Commuter Rail Project; India

The estimated Cost is about Rs 16,000 Crore, about Rs 3000 Crore less compared to the earlier Proposal.

By Sheen Kachroo; 28/07/2019; Urban Transport News



Bengaluru (Urban Transport News): Railway consultancy firm, RITES (Rail India Technical and Economic Service) have proposed to link the KSR Bengaluru city station and Kempegowda international airport with a dedicated suburban rail network. The revised detailed project report (DPR) of Bengaluru Suburban Rail project has been submitted to Indian Railways.

The four corridors identified are: KSR Bengaluru city –Devanahalli, Chikkabanavara – yeshwantpur –Byappanahalli, Heelalige -yelahanka –Rajanukunte and Kengeri –KSR Bengaluru –White field.

According to Railway sources, the numbers of sub urban station have been reduced to 53 against 82 proposed. The total sun urban network has also been reduced to 161 km-147 km. The estimated cost is about Rs 16,000 crore, about Rs 3000 crore less compared to the earlier proposal.

Citing a letter from the Prime Minister's office, the railway board in April asked K-RIDE, a nodal agency for the project to restructure the proposal and revise detailed project report (DPR) prepared by RITES. The letter had stated that the number of suburban stations within the city should be reduced. The passengers from the KSR bengaluru city –KIA is likely to benefit.

The centre has received a message that Bangalore Metro Rail Corporation (BMRC) is developing the link between Central Silk Board Junction to Devanhalli via outer ring road, serving the population of east and south sector of Bengaluru. However, the western, north western and central parts of the city don't have a direct connection to the airport via mass public transportation system.

While the Bangalore International Airport Limited (BIAL) already promised that the airport boundary will be build by them and would offer shuttle service to the passengers.

In 2008, the state government had proposed a high speed rail link from MG road to KIA that promised to cover 33 km in 25 minutes but the project was in cold storage due to high cost and land acquisition issues.

NCRTC invites Bids for Supply of 22,000 MT Rails for Delhi-Meerut RRTS Project; India

By [Narendra Shah](#); 10/12/2019; Metro Rail News



NCRTC floats Tender for Delhi-Meerut RRTS Project

New Delhi, India (Metro Rail News): The National Capital Region Transport Corporation Limited (NCRTC) invites online bids on open competitive bidding (OCB) basis from the eligible manufacture or **supplier of head hardened rails** for Delhi-Meerut RRTS project.

Scope of Work

Vendor needs to Manufacture, Supply, transportation and delivery of 22,000 MT of ***UIC 60/60E-1/60KG 1080 Grade Head Hardened Rails Class-A conforming to IRS T-12-2009*** (latest amendment) for Delhi-Ghaziabad-Meerut Regional Rapid Transit System (RRTS) Corridor in India.

Eligibility Criteria

- The Bidder must have a minimum average annual turnover of INR 1650 Million or equivalent calculated as total payments received by the Bidder for Supply contracts completed or under execution over the last 5 years.
- The Bidder must demonstrate that it has Successful completion as the main supplier after 1st January 2014 of supply of at least 80,000 MT of Rails.

- The Bidder shall demonstrate that the **UIC 60/60E-1/ 60 Kg 1080 Grade Head Hardened Rails have been in production for at least 5 years, and been sold a minimum of 40000 MT of UIC 60/60E-1/60kg 1080 Grade Head Hardened Rails** over the last 3 years. A total of 5000 MT of Rails out of the quantity mentioned above should have been in satisfactory use in mainline in passenger traffic/mixed traffic carrying Railway/Metro/High Speed/RRTS Commuter systems in operation for a minimum of 3 years.
- The Bidder shall demonstrate the availability of or access to liquid assets, lines of credit, and other finances sufficient to meet cash flow requirement which is INR 400 Million or Equivalent.



ORF Special Report No. 13, July 2017

20, Rouse Avenue Institutional Area, New Delhi - 110 002, INDIA
 Ph. : +91-11-43520020, 30220020. Fax : +91-11-43520003, 23210773
 E-mail: contactus@orfonline.org
 Website: www.orfonline.org

ABSTRACT

The Observer Research Foundation, with support from UBER, convened a roundtable on *The Future of Urban Mobility in India* in May this year (2017) in Mumbai. Participants also gathered in smaller groups to outline key concerns currently limiting urban mobility – such as supporting infrastructure, principles for regulating the ride-sharing industry, and dynamic pricing.

Observer Research Foundation (ORF) is a public policy think-tank that aims to influence formulation of policies for building a strong and prosperous India. ORF pursues these goals by providing informed and productive inputs, in-depth research, and stimulating discussions.

Officials from the Maharashtra state government joined the discussions with members of civil society working at the intersection of innovation and urban mobility, business, and academia. This report is an outcome of the discussions and recommendations proposed by the participants at the roundtable. As India's urban hubs continue to become more congested and polluted—and with increasing road fatalities and inequity in access—India will need to find a solution to fix its urban mobility crisis. Expanding public transportation services will be key to transforming mobility in India's urban centres, along with efficient use of existing roads and smarter traffic management through technology-based interventions.

While the majority of Indian citizens still live in rural areas, last estimated at 70 percent of the total population cities in India are also growing, with the number of inhabitants currently in the hundreds of millions. By 2030, India will see the rise of some 68 urban sprawls, each with a population of more than one million; the entire continent of Europe only has 35. It is indisputable that cities are the engines of economic growth. To realise the full potential of its economy and demography, India must not only look to increase its rate of urbanisation but also enhance the quality of life in existing cities. Today, Indian cities are characterised by increasing levels of congestion, pollution, road fatalities, and inequity in access. To build inclusive, safer, and more sustainable cities of tomorrow, technology will play a decisive role in identifying mobility gaps and transforming existing transportation services.

The discussion around urban mobility in India stands transformed today for two reasons. First, technology has enabled real-time analysis of public transportation routes and traffic patterns that was previously not possible.

Second, public sector agencies have now begun to encourage the use of public transportation through new mobility business models such as on-demand and multimodal trip-planning applications. This is the reflection of a global trend, where governments and businesses are exploring mobility solutions through multimodal transportation — where users will have the option of seamlessly integrating services like public transportation and ride-sharing, instead of having to choose one over the other. Integrated payment systems such as London's Oyster and Singapore's EZ-Link allow users to opt for different modes of public transportation through a single smartcard. These solutions, however, cannot be realised through the efforts of any one entity alone.

Integration will require collaborative efforts by a diverse set of stakeholders: Among them, central and state governments, transit agencies, infrastructure developers, transportation service providers, and data scientists.

INTRODUCTION

As companies explore different ways to provide mobility in Indian cities, through ride-sharing, bus aggregation and car rentals — stakeholders must agree on the guiding principles for regulating the on-demand and ride-sharing industry.

Recognising these realities, the Observer Research Foundation (ORF), with support from UBER, convened a roundtable on *The Future of Urban Mobility in India* in early May in Mumbai. The participants included Maharashtra government personnel, and members of civil society working at the intersection of innovation and urban mobility, business, and academia. In addition to a roundtable discussion, a workshop was organised where breakout groups outlined key concerns currently limiting urban mobility—from infrastructure deficits to the absence of clear regulatory principles for on-demand and ride-sharing applications. Following the structure of the workshop, the recommendations are

divided into three sections: evaluating infrastructure and promoting innovation in mobility, regulation of the ridesharing industry, and adoption of dynamic pricing.

I. Evaluating Transportation Infrastructure and Promoting Innovation in Urban Mobility

The roundtable participants agreed that deficiencies in supporting infrastructure would need to be addressed before adopting new technologies in urban mobility such as driverless or electric cars. The transportation infrastructure in India—consisting of roads, suburban railways, metro lines and fuel stations—is inadequate in supporting current needs or any future rise in population. Poor transportation infrastructure development may be attributed to lack of political will, skills, and coordination amongst public agencies both at the state and city level. For example, there is insufficient route allocation for public transportation, leading to over-crowding in some routes and deficit in others. Experts have earlier noted other reasons for delay in development of infrastructure, including failure in devising and applying common design standards during construction and high costs and time-consuming processes involved in land acquisition.

Further, the absence of reliable travel data, until now, has made it difficult for public officials to assess the impact of infrastructure projects on urban mobility and to identify future needs. This is no longer the case with developments in geo-mapping technologies and open standards, with GTFS (General Transit Feed Specification) being the most commonly used. Transit agencies need to make GTFS feeds on routes and schedules and GIS locations on transport infrastructure publicly available. Some transit agencies have also released data sets on budgetary, performance and ridership data. Government officials and businesses can make pointed investments in supporting infrastructure by analysing historical data on roadways and transportation.

This data can be useful for policymakers, transit agencies, and urban planners to enable infrastructure to facilitate better mobility through efficient use of existing roads and smarter traffic management. Moreover, open transport data in other countries has led to the development of third-party mobile applications sharing real-time transit information, which enables users to plan their trips better, leading in turn to increased ridership and improved customer experience. Indeed, studies have shown that open data in transportation presents huge economic opportunities — valued at between US\$ 720 and US\$ 920 billion globally — as it results in innovation in multi-modal planning apps and new mobility businesses.

Specific Recommendations

The public and private sectors must collaborate to devise and develop India-centric solutions to fix the country's cities. Government agencies should invest resources to make transportation data open to the public to encourage innovation through development of new business models to mitigate the mobility crisis in the country.

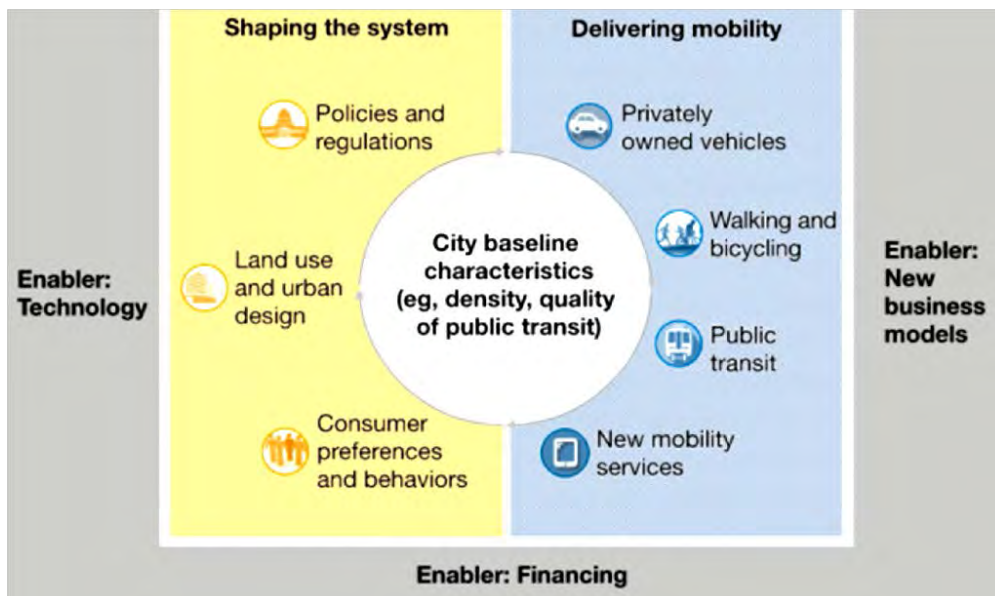


Figure 1: Factors affecting Urban Mobility; *Source: Urban mobility at a tipping point, McKinsey & Company, 2015*

- The private sector can share data on number of vehicles, traffic patterns, accidents, and user behaviour to allow policymakers to introduce evidence-based regulations on pricing and safety. Companies must share data in an anonymous, aggregate manner and effectively address any privacy concerns of users when sharing data. The regulators, meanwhile, will need to ensure that proprietary rights of the companies are protected and consider the role of intermediaries to handle the data. In addition to this, regulators must have the systems in place to leverage the most from available data.
- Private car ride-sharing and car-pooling services will form only a part of the solution. Policymakers must look at revamping public transportation and infrastructure to transform urban mobility.
- Regulations must be introduced to encourage efficient use of existing roads and smarter traffic management. For example, not allowing trucks and large commercial carriers to ply city roads during the day.
- Policymakers must collaborate with data scientists to explore mechanisms to implement congestion pricing and dynamic pricing for parking spaces.
- The ride-sharing industry in the country must look at reducing, even eliminating, driver dependency on middlemen or intermediaries to procure cars. The ride-sharing industry must explore different creditrating processes for their driver-partners.
- Transit agencies must ensure that buses are equipped with GPS tracking in order to provide real-time schedules and routes.
- Governments must ensure that the adequate ecosystem is in place before adopting new technologies in mobility. For instance, to adopt electric vehicles, cities must have first installed sufficient number of charging stations.
- Authorities must consider revising the regulatory framework in place to use vehicles for commercial use

II. Principles for Governing the Ride-Sharing Industry in India

Participants in ORF's roundtable agreed that regulations governing the ridesharing industry must promote user safety and competition in the market.

However, regulation should not dictate business models and must be non-prescriptive or 'light touch'. After all, the transport department is usually an incumbent in the market and must not play the role of a regulator.

To guide regulation, principles based on fairness, equity and safety must first be established with the purpose of incentivising new and smaller players in the market. Regulation or the lack of it plays an important role in promoting innovation. This, when companies are trying to push the government to legalise new mobility models such as using private cars for ride-sharing with some state governments contemplating banning ride-sharing altogether. However, regulators have the additional burden of protecting user safety and would be cautious before adopting new business models. As drivers of traditional taxi services and ride-sharing companies demand government intervention to safeguard their interests, to prevent falling incomes and changing incentive structures — companies must be transparent in their policies and directly address issues involving their drivers.

Companies must share with regulators their data on pricing mechanisms and user behavior, such as user demand and willingness to pay, to help promote evidence-based policymaking.

In Maharashtra, the enforcement of the City Taxi Rules, 2017 might have an adverse effect on competition as it imposes a significant license fee on driver-partners seeking to operate through ride-sharing applications. Ridesharing companies should be allowed to regulate themselves and the point of entry for public regulation must only lie in safeguarding consumer safety and competition in the market. The licensing authority must not prescribe either a price floor or cap on surge pricing, and regulators must instead consult with the Competition Commission of India (CCI) before regulating pricing.

Specific Recommendations

- The government, along with other stakeholders, must first agree on general principles to govern the ride-sharing industry before adopting any regulation.
- Ride-sharing platforms must be allowed to self-regulate. Authorities must avoid excessive regulation — for instance, the Maharashtra City Taxi Rules requires app-based taxis to adhere to a minimum limit for engine capacity and requires operators to have 30 percent of the vehicles on their platform over 1400 cc.
- Regulators must consult CCI to ensure that policies on licensing, vehicle standards and pricing are not anti-competitive — they must not act as a barrier to entry for drivers looking to join taxi aggregators.
- Accidents and criminal behaviour involving their drivers during the course of the journey must be mitigated through minimum insurance.

III. Adopting dynamic Pricing to meet Urban Mobility Challenges

Ride-sharing companies price their fares dynamically based on variables including estimated time and distance of the predicted route, estimated traffic, and the number of riders and drivers using the service at a given moment.

During high demand for rides, prices peak to reflect the 'surge' in demand to ensure that pickups are available for riders who are willing to pay the increased fare. UBER has attracted criticism for inflating prices after terrorist attacks, during natural disasters and even while Delhi implemented its odd-even scheme in early 2016. In the aftermath of the London Bridge attack in June this year, UBER suspended their surge pricing after some

delay and refunded those users who were charged an increased fare — a practice the company has followed earlier during terror incidents. State governments including Delhi, Karnataka and most recently, Maharashtra, have clamped down on taxi aggregators charging surge pricing by introducing caps on fares. Governments introduce caps on surge pricing to safeguard consumer interests and prevent predatory pricing.

Surge or dynamic pricing helps in increasing vehicle utilisation and reliability, and dynamic pricing based on demand and supply of drivers on a real-time basis ensures access to mobility. However, during emergencies such as natural disasters and terrorist attacks, surge pricing must be suspended.

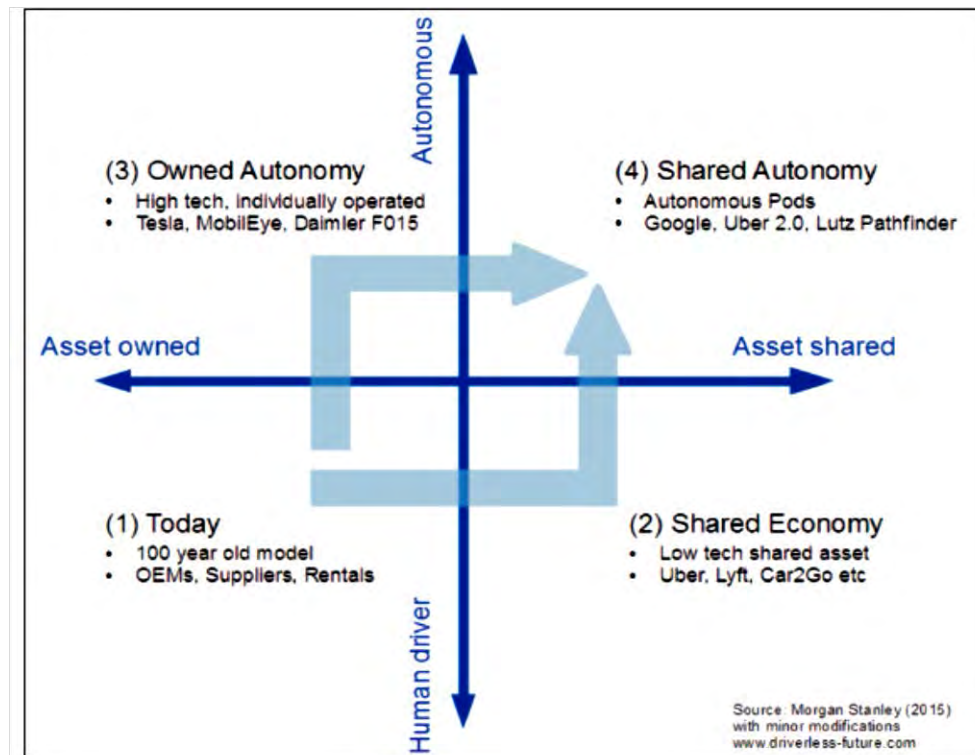


Figure 2: Four Stages of Mobility

The dynamic pricing model must also be imported to parking spaces to deter driving and to encourage public transportation. Dynamic pricing in the ridesharing industry has been successful in influencing user behaviour in India. In the future, policymakers must consider dynamic pricing mechanisms based on variables such as road congestion, fuel efficiency, and carbon emissions.

Specific Recommendations

- Ride-sharing applications must suspend surge pricing during natural calamities, civil unrest, terrorist attacks and in other special circumstances prescribed by the state government.
- The CCI should intervene in pricing of ride-sharing applications only when the anti-competitive effects of the same can be proven.
- The State Government may prescribe fares temporarily to arrest instances of anti-competitive practices after due consultation with the CCI.
- Use dynamic pricing to charge for parking—on streets and in parking lots—to discourage people from using personal transportation.

India's urban mobility challenge will only become more acute in the coming decade as cities become more crowded, polluted and unsafe. Any mobility crisis is a unique one,

seeing as it involves a multitude of actors from transit agencies to ICT entrepreneurs. To meet the challenge effectively, a dialogue between stakeholders is essential to evaluate assets and to devise innovative mobility solutions. To encourage new businesses that leverage technology to provide mobility, policymakers must first agree on principles for regulation based on fairness, safety and equity. New mobility is a lucrative industry—one that can serve local communities and provide opportunities to many. As the Maharashtra government looks to make sustainable urban transport a priority, Mumbai can become a model for policymakers and entrepreneurs in India to use ICT to provide customised, safe and sustainable transportation to all.

Author: Madhulika Srikumar is a Junior Fellow with ORF's Cyber Security and Internet Governance Initiative.

ENDNOTES

1. "About 70 per cent Indians live in rural areas: Census report", The Hindu, July 15, 2011, <http://www.thehindu.com/news/national/About-70-per-cent-Indians-live-in-rural-areas-Census-report/article13744351.ece>
2. "India's urban awakening ", McKinsey & Company ", April, 2010, http://www.mckinsey.com/~media/mckinsey/global%20themes/urbanization/urban%20awakening%20in%20india/mgi_indias_urban_awakening_full_report.ashx
3. Kailash Korde, "Mumbai's kaali-peelis to launch their own mobile app to race ahead of Uber and Ola", Hindustan Times, May 2, 2017, <http://www.hindustantimes.com/mumbai-news/mumbai-s-kaali-peelis-launch-their-own-mobile-app-to-race-ahead-of-uber-and-ola/story-oJm6iro9PnCKDEAMdJKcJP.html>
4. Oyster Cards, Transport for London
5. <https://oyster.tfl.gov.uk/oyster/entry.do>
6. Rahul Sachitanand, "How new startups like LiftO, Shuttlr, rBus are trying to solve urban commuting problem", The Economic Times, accessed June 9, 2017, <http://economictimes.indiatimes.com/small-biz/startups/how-new-startups-like-lifto-shuttlr-rbus-are-trying-to-solve-urban-commuting-problem/articleshow/49304150.cms>
7. "Urban Transport in India", Indian Institute for Human Settlements, accessed July, 2015, http://iihs.co.in/knowledge-gateway/wp-content/uploads/2015/07/RFWorking-Paper-Transport_edited_09062015_Final_reduced-size.pdf
8. See for example the MBTA (Massachusetts Bay Transportation Authority) dashboard where data on reliability, ridership, financials and customer satisfaction have been made public.
9. Sarah M. Kaufman , "Getting Started with Open Data" , NYU Wagner, May, 2012, <https://wagner.nyu.edu/files/rudincenter/opendata.pdf>
10. Zainab Kakal, Roshan Toshniwal, "Why India needs open data for better urban mobility", The City Fix, February 19, 2015, <http://thecityfix.com/blog/india-needs-open-data-better-urban-mobility-zainab-kakal-roshan-toshniwal/>, "Open data: Unlocking innovation and performance with liquid information", McKinsey Global Institute, October, 2013, 2017, http://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Open%20data%20Unlocking%20innovation%20and%20performance%20with%20liquid%20information/MGI_Open_data_Executive_summary_Oct_2013.ashx
11. Sayan Chakraborty, Mihir Dalal, "Uber lobbying with govt to allow ride sharing using private cars in India", Livemint, March 7, 2017, <http://www.livemint.com/Companies/ZWMN3J1xSTNAITkOKooSkJ/Uber-lobbying-with-govt-to-allow-ride-sharing-using-private.html>
12. Sunny Sen, "Is it end of road for ride-sharing by Uber and Ola, over safety, legality debate?", Hindustan Times, , February 7, 2017, [http://www.hindustantimes.com/](http://www.hindustantimes.com/business-) business-

news/is-it-end-of-road-for-ride-sharing-by-uber-and-ola-over-safety-legality-concerns/story-QRq21sDNNkEYm7HcA31W7I.html

13. Sweta Goswami, "Ola-Uber strike back in Delhi on Tuesday: Brace for high fares, long wait", Hindustan Times, April 17, 2017, <http://www.hindustantimes.com/delhinews/ola-uber-protest-strike-back-on-tuesday-brace-for-higher-cab-fares-longerwait/story-gUYGNT79cJKk3zyYlTfpZP.html>

14. Sweta Goswami, Heena Kausar, "Delhi Ola, Uber strike enters Day 8: Few cabs plying but commuter woes continue", Hindustan Times, February 17, 2017, <http://www.hindustantimes.com/delhi-news/delhi-ola-uber-strike-enters-day-8-few-cabs-plying-but-commuters-woe-continue/story-cVMlk4UoM49uYt6nnU9ORN.html>

15. Anurag Mazumdar, "Why the Problems of Uber, Ola Drivers Are Far From Over", The Wire, accessed June 9, 2017, <https://thewire.in/113979/ola-uber-driver-problemfar/>

16. Kailash Korde, "Surge pricing: Here's how Maharashtra will regulate Ola and Uber cabs", Hindustan Times, March 5, 2017, <http://www.hindustantimes.com/mumbainews/maharashtra-finally-has-rules-to-regulate-ola-and-uber-cabs/storyztQncRSwGzq088I180wXyH.html>, Maharashtra City Taxi Rules, 2017, <https://transport.maharashtra.gov.in/Site/Upload/Pdf/mahacts17%20.pdf?MenuID=1227>

17. UBER's fares are priced according to above the mentioned variables - <https://help.uber.com/h/34212e8b-d69a-4d8a-a923-095d3075b487>

18. Charles Riley, "Uber criticized for surge pricing after London terror attack", CNN, June 5, 2017, [pricing/index.html](http://www.cnn.com/2017/06/05/uk/uber-surge-pricing/index.html)

19. Victor Luckerson, "Uber Agrees to Limit Surge Pricing During Emergencies, Disasters", Time, accessed July 8, 2017, <http://time.com/2967490/uber-agrees-to-limit-surge-pricing-during-emergencies-disasters/>

20. Pritha Chatterjee, Sarah Hafeez, "Odd-Even phase II: Uber, Ola withdraw surge price after govt warns of strong measures", The Indian Express, April 6, 2016, <http://indianexpress.com/article/cities/delhi/arvind-kejriwal-uber-surge-pricingdelhi-odd-even-ola-app-based-taxis/>

21. Josie Cox, "London terror attack: Uber slammed for being slow to turn off 'surge pricing' after rampage", Independent, June 4, 2017, <http://www.independent.co.uk/news/uk/home-news/london-terror-attack-uber-criticised-surge-pricing-afterlondon-bridge-black-cab-a7772246.html>

22. Holly Christodoulou, "FARE PLAY Uber to refund those who fled London Bridge attack after being criticised for activating surge prices", The Sun, accessed June 5, 2017, <https://www.thesun.co.uk/news/3728351/london-bridge-attack-uberrefund-price-surge/>

23. Harry Readhead, "Brussels attacks: Uber turns off surge pricing in Belgian capital", Metro, March 22, 2016, <http://metro.co.uk/2016/03/22/brussels-attacks-uberturns-off-surge-pricing-in-belgian-capital-5768254/>

24. "Delhi government acted against 8,000 cabs for surge pricing", The Indian Express, accessed June 9, 2017, <http://indianexpress.com/article/cities/delhi/delhi-cabssurge-pricing-ola-and-uber-cabs-4424144/>

25. Umesh Yadhav, Mugdha Variyar, "Uber ordered to limit surge pricing, comply with Karnataka rules for taxi aggregators", The Economic Times, November 11, 2016, <http://economictimes.indiatimes.com/small-biz/startups/uber-ordered-to-limitsurge-pricing-comply-with-karnataka-rules-for-taxi-aggregators/articleshow/55364437.cms>

26. Kailash Korde, "Surge pricing: Here's how Maharashtra will regulate Ola and Uber cabs", Hindustan Times, March 5, 2017, <http://www.hindustantimes.com/mumbai-news/maharashtra-finally-has-rules-to-regulate-ola-and-uber-cabs/storyztQncRSwGzq088I180wXyH.html>

27. "Digital-Age Transportation: The Future of Urban Mobility", Deloitte University Press, July, 2014, https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/public-sector/EN_Digital-Age-TRANSPORTATION_16.07.2014.pdf

28. Id.

29. Somit Sen, Sujit Mahamulkar, “Maharashtra govt policy proposes costlier vehicles, high parking fees”, The Times of India, June 7, 2017, <http://timesofindia.indiatimes.com/city/mumbai/state-draft-proposes-costlier-vehicles-high-parking-fees/articleshow/59042684.cms>

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

How does CBTC work? Understanding the Risks and Benefits

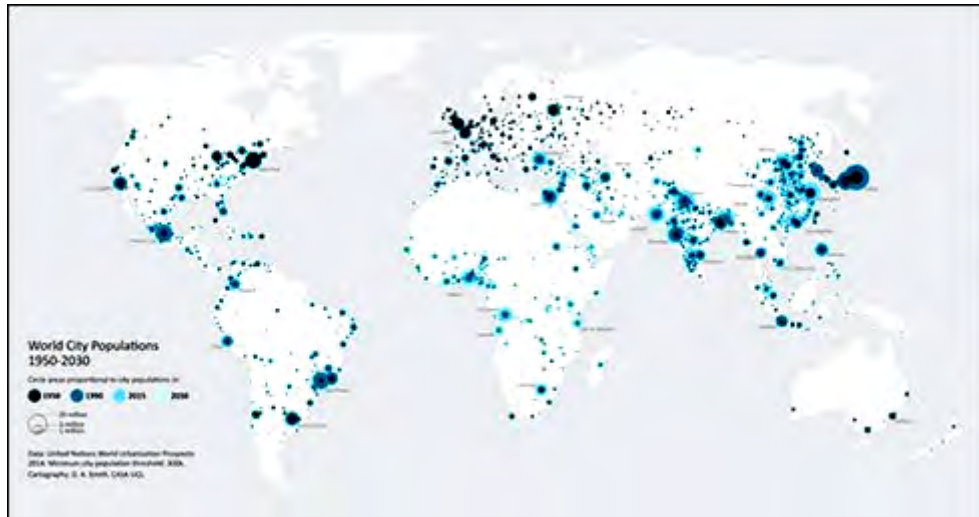


Richard Weatherburn 11/23/16

Around the world, railway operators are looking for ways to increase train capacity and improve railway infrastructure. Through the use of exact, real-time train information, Communication-Based Train Control (CBTC) offers a solution to capacity challenges, while avoiding the need for expensive and disruptive civil engineering capital projects.

If you're connected to the transportation industry, you need to know the real story behind CBTC and how it plays out in real-world applications. It's critical for you and your team to dive deeper into its benefits – and risks.

At a high level, CBTC overcomes the traditional challenges of railway systems by making use of telecommunications between the train and track equipment for real-time traffic management and infrastructure control. It is also the technology behind driverless or fully-automated trains. A CBTC system enables shorter, lighter and faster trains running more closely together to increase capacity over longer trains running on a fixed block signaling system.



The trend of increasing urbanization, coupled with the desire for mobility, has put more demands on urban railway systems capacity than ever before.

There are many benefits of using CBTC in your railway's infrastructure. The top three include:

1. **Pinpoint Train Locations.** With CBTC, you can know the precise position of a train at any given time.
2. **Communicate Instantly between Trains and Station.** With constant communication between the trains and the trackside, CBTC enables you to maximize capacity and shorten the distance or time between trains.
3. **Prevent Failure of Critical Systems.** With CBTC, you can manage railway traffic and speed in a more efficient and safe way.

Overall, the increased understanding of train positioning, the continuous communication between the trains and control center and the enhanced safety features makes it easier to run a more flexible railway system.

So what does this increased flexibility mean to you? You can:

- Run trains faster and closer together during peak times and slower and further apart during slow periods
- Use passenger counting systems to manage the flow of people in stations for shorter lines and less waiting for your passengers
- React to any issues in real time, including immediate knowledge of accidents and how to manage around them
- Monitor and manage electricity and energy use on the trains, reducing operating costs



Increased understanding of train positioning, the continuous communication between the trains and station and the enhanced safety features makes it easier run a more flexible railway system.

While CBTC's use of continuous, bi-directional communication between trains and the control room provides numerous benefits, it's important to understand the potential risks. Many challenges with CBTC stem from the demanding railway environment and the high speed of moving trains.

Poor train-to-ground communication performance can result in temporary reduction in speed, a complete train stop, or a train operating in a degraded mode until communications are restored.

These risks are exactly why CBTC networks require an extremely high level of availability and low latency.

How do you know if your network meets CBTC requirements? This table outlines what your network needs to deliver the CBTC benefits we've outlined. It also indicates how Belden can help you meet them.

CBTC Network Requirements	Belden's Solution
Fast Roaming. For safety reasons, any disruption in the CBTC service will bring trains to a stop. Because of this, a roaming handover time of less than 50 ms is essential.	Belden's products offer seamless Layer 3 roaming with a 0 ms handover time.
Error Tolerance. Loss of the data being transmitted will result in system errors, so a packet loss of less than 0.1 percent is required.	Belden's redundancy measures and interference immunity ensure no data is lost.

Network Latency. To ensure real-time control, the maximum latency must be less than 5 ms.	Belden ensures latency under 5 ms. Parallel redundancy protocol (PRP) always forwards the fastest packet.
Sufficient Bandwidth. To carry the required data, your network must have a bandwidth of at least 4 Mbit/s.	Belden's wireless local area network (WLAN) devices provide high throughput rates for both today's demands and future scalability.

Choosing the right network components and cable is essential to meeting the availability and latency requirements for a fully functioning CBTC network.

Belden's wireless train-to-ground communication solution meets each CBTC requirement. Belden's Hirschmann brand delivers a robust wireless train-to-ground communication solution for high speed rail applications, offering seamless roaming and zero packet loss.

And, Belden's solution is unique in that it supplies the *entire* communication network. This includes the fiber cabling and data in the control room – not just the on-train and the train-to-ground solutions.

To learn more about Belden's solutions for train-to-ground communications, view our full technical bulletin, ***A Revolutionary Solution for Communication Based Train Control (CBTC) Applications***.

You can also learn more about railway infrastructure and what to look for when choosing train-to-ground communication systems by downloading our white paper "Wireless Train-to-Ground Communication," below.

Have you implemented CBTC in your own railway infrastructure? If so, what benefits have you seen? We look forward to hearing from you.

Makati City Subway Project expected by Year End; Philippines

Dec. 9th, 2019; written by [David Burroughs](#) ; IRJ

CONSTRUCTION of the Makati City Subway Project (MkTr) in Manila could begin by the end of the year, after receiving an environmental clearance from the Philippines Department of Environmental and Natural Resources (DENR).



The line will connect with LRT Line 3.

The \$US 3.5bn project is being undertaken as a public-private partnership (PPP) between the City Government of Makati and a joint venture between Philippine Infradev and Chinese firms Greenland Holdings Group, Jiangsu Provincial Construction Group and China Harbour Engineering Company.

The 10km line will have 10 stations serving Makati's central business district, and is expected to carry around 700,000 passengers a day. Makati has a population of one million residents, but this swells to five million during the day due to the four million employees and workers who move in and out of the financial district during working hours.

The project will connect key points within the city, including:

- the central business district at the corner of Ayala and Sen Gil Puyat Avenues
- Circuit City
- Makati City Hall
- University of Makati, and
- Makati Hospital.

The project includes connections to other transport systems such as MRT Line 3, the Pasig River ferry and the proposed Metro Manila Mega Subway.

Philippine Infradev president and CEO, Mr Antonio Tiu, told *BusinessWorld* the company is working to secure the final permits to be able to start work on the metro immediately. Tiu said the line may be completed in 2024, a year ahead of its 2025 deadline.

ST Engineering launches variable Platform Screen Doors; Australia

5th December 2019; Metro Rail News



SCREEN DOORS: ST Engineering launched its variable pitch platform screen door at the AusRAIL Plus trade show that took place in Sydney on December 3-5.

The VP-PSD detects the door configuration as each train approaches the platform, automatically moving the doors to the correct stopping position. This makes the PSDs suitable for use at stations served by a mixed fleet, where the train doors are not always in the same position on a platform. A 'finger gap sensor' prevents passengers from getting trapped between the doors.

ST Engineering's Deputy President, Mobility, Bernard Chow told *Metro Report International* that the flexible door product was aimed at cities with large legacy metro or suburban rail networks operated by diverse rolling stock fleets; in particular, the company was looking at cities where major upgrading work is underway, including resignalling for automated operation.

As well as Sydney, Chow suggested other targets could include the New York Subway and London Underground. However, a challenge for retrofitting doors lies in ensuring the platform edge has been reinforced sufficiently to carry the extra weight. There can also be challenges where lineside cables have been laid directly below the platform edge.

Nevertheless, Chow highlighted the company's successful retrofitting of PSDs on metros in Bangkok and Taipei. ST Engineering is also rolling out condition-based maintenance technology with data-driven predictive maintenance on its PSDs in Singapore, he added.

Hannover LRVs to be fitted with Collision Detection Technology; Germany

10th December 2019; Metro Rail News



GERMANY: Hannover Transport Operator Üstra has awarded Kiepe Electric a contract to equip 50 Light Rail Vehicles (LRV) with collision detection systems.

Following a successful trial with a TW3000 vehicle, 50 more are to be retrofitted next year. Bosch Engineering will provide the technology.

Radar and camera sensors continuously monitor the distance between the LRV and objects ahead of it, as well as the speed at which they are travelling. If a collision seems imminent, a warning is conveyed to the driver, and brakes are automatically activated if the driver fails to intervene in time. The driver can manually override the autonomous braking, to either brake harder or release the brakes.

Keolis orders Battery Buses and Trolley Buses for Bergen; Norway

5th December 2019, Metro Rail News



NORWAY: Keolis Norge has ordered 88 battery buses and 10 battery trolleybuses for use in Bergen under two contracts announced on December 2.

Yutong Eurobus Scandinavian is to supply 88 E12 electric buses next year. A pre-production prototype is due to be delivered next month. The 12 m long buses will have 34 seats and will be equipped with 422 kWh batteries.

Solaris Bus & Coach is to supply 10 Trollino 18 articulated trolleybuses under an €8m contract. Deliveries are scheduled to begin in September 2020. The 240 kW motor will be powered using overhead wires and 55 kWh traction batteries that would enable up to 11 km of off-wire running. These would be charged from the overhead wires.

The low-floor trolleybuses will have 47 seats and a built-in breathalyser to check the driver's sobriety before starting the vehicle. The vehicles will also be winterised for local conditions.

Keolis has a Nkr3bn contract to operate bus and trolleybus services in Bergen city centre from 2020 to 2030. It is planning to purchase 40 buses powered by hydrotreated vegetable oil.

High Capacity Light Rail in Ottawa; Canada

Written by William C. Vantuono, Editor-in-Chief ;December 09, 2019; C&S, Light Rail, News, Passenger, Rapid Transit; Railway Age



Tunney's Pasture Station. All photos by William C. Vantuono, except where noted.

RAILWAY AGE, DECEMBER 2019 ISSUE: If legendary New York Yankees catcher Yogi Berra were to ride Ottawa's new Confederation Line, he would say—provided he was familiar with the old North Shore's Electroliners or Philadelphia Suburban Transportation Co.'s Liberty Liners—"It's déjà vu all over again."

Berra's famous malapropisms aside, OC Transpo may have come to a fork in the road and taken it in selecting what is best described as **hybrid rail transit technology** for the Confederation Line. In the traditional sense, it's not light rail. Nor is it rapid transit. It's **High Capacity Light Rail, or HCLR**, to coin a new acronym. But because a portion, in Ottawa's

Central Business District, is underground, some at OC Transpo call it **High Capacity Light Subway (HCLS)**.



Suffice to say, the Confederation Line — with up to 180,000 weekday riders, the busiest single-line LRT in North America — combines characteristics of both:

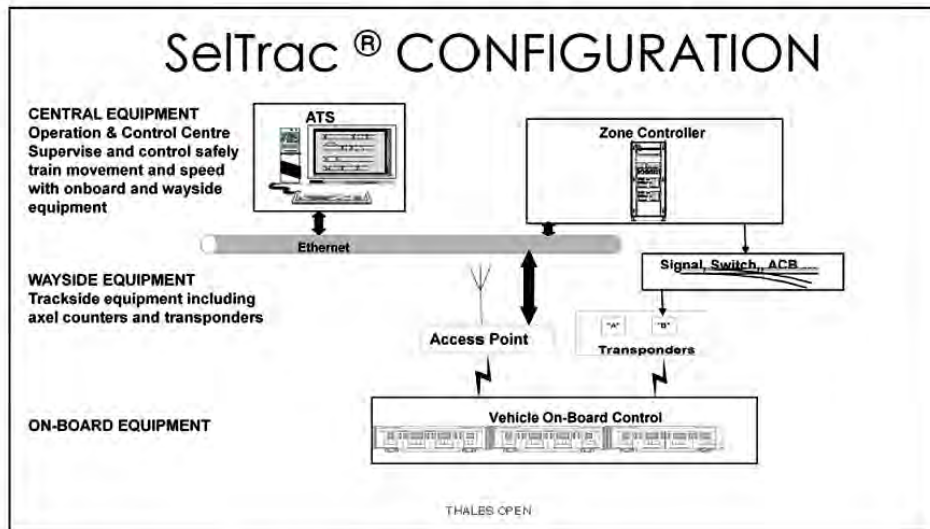
- Four-section-articulated, 100% low-floor, 49-meter (160.8 feet)-long, 600-person-capacity Alstom Citadis Spirit vehicles, operated in pairs totaling 98 meters (321.6 feet). Eventually, they will be extended to 118 meters (387 feet) by adding a fifth section to one of the cars in each trainset. The vehicles have an on-demand door-opening mode, activated by the driver, for use in extreme cold to assist in maintaining the vehicle's internal temperature. Passengers can activate the doors when the vehicle is stopped in a station. OC Transpo's vehicles have been compared to the Electroliners, as they are similar in size and configuration.



- Continuous ATC (Automatic Train Control) and ATO (Automatic Train Operation) with driverless capability through an RF (radio frequency)-based Thales SelTrac™ moving-block CBTC (Communication Based Train Control) system. RF antennas are located at both ends of the trainset; transponders determine vehicle position. Speed sensors and accelerometers determine fine positioning. Wayside RF antennas are spaced 200 meters (656 feet) apart, with overlap redundancy to ensure continuous signal propagation. It is the latest iteration of SelTrac™.

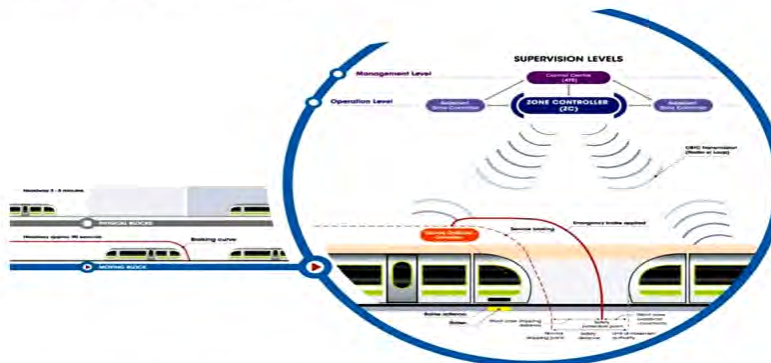


SelTrac™ Transponder



WRU	Wayside Radio Unit
AP	Access Point (for wayside wireless communications)
OCC	Centralizes and automates the operation of the rail network

SelTrac[™] CBTC Architecture



High-level architecture for Thales' SelTrac[™] Communications-Based Train Control (CBTC) system being installed on Ottawa's O-Train Confederation Line.

- Headways of approximately 4 minutes, 7 seconds with the current 13-trainset fleet. Four additional trainsets, bringing the Citadis Spirit fleet to 17 (34 cars), will reduce headways to approximately 3 minutes, 20 seconds. A full complement of 19 trainsets will offer even tighter headways (the **CBTC system is capable of supporting 1 minute, 45 seconds**).



- Maximum operating speed of 80 kmph (50 mph). No highway-rail grade crossings.
- 8,000 PPHPD (people per hour, per direction) capacity, increasing to 11,000 once all vehicles are in service.



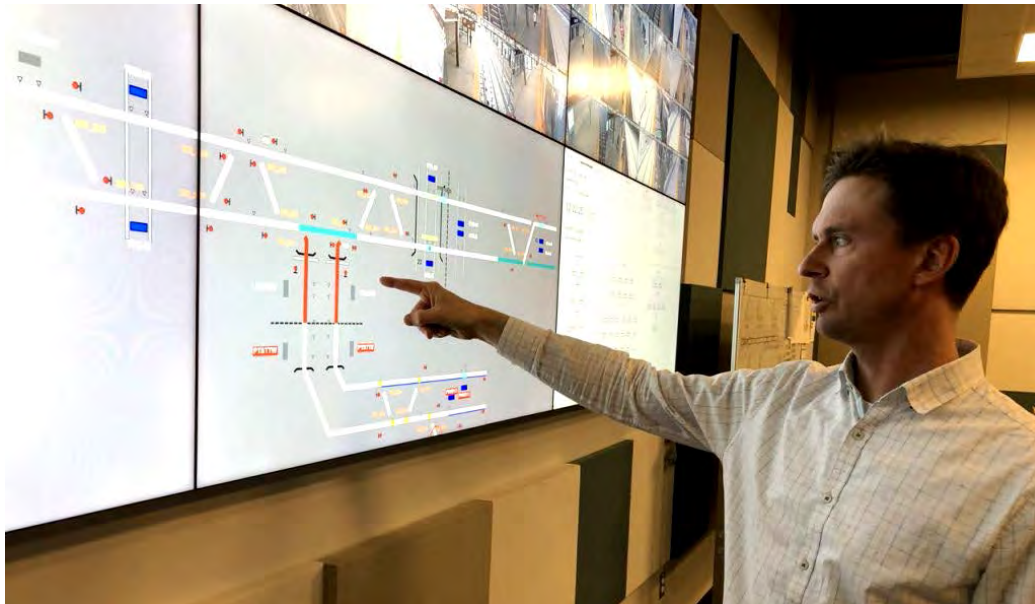
Station Information Display with Receptacles for Waste and various Types of Recyclables — a sustainable standard in Canada. U.S. Transit Systems should do the same

The Confederation Line (Line 1) opened to revenue passengers on Sept. 14, 2019. The name reflected the original hope of starting service in 2017, the 150th anniversary of Canada becoming a nation. The project cost an estimated C\$2.1 billion, making it the largest infrastructure project in Ottawa's history. The bulk of the cost was for construction, as most of the property needed was publicly owned.



A west-bound Train pulls into Underground at Rideau Centre Station in Ottawa's Central Business District

Ottawa signed a 30-year DBFM (Design-Build-Finance-Maintain) agreement with the Rideau Transit Group (SNC-Lavalin, ACS Infrastructure Canada Inc. and EllisDon). OC Transpo operates the system with its own employees. Ottawa City Council approved the Confederation Line in December 2012, with construction beginning the following year. This followed many years of study and debate, including the awarding, then cancellation, of a contract for a completely different route to south Ottawa.



OC Transpo Operations Control Center Manager Joel Lemieux explains the Confederation Line dispatching Display. The Center controls all OC Transpo Rail, Bus and Para-Transit Services

The argument frequently arose as to whether or not Ottawa had the population to warrant a rail transit system. However, steady growth—population has doubled, from 500,000 30 years ago to 1 million today—coupled with the lack of a comprehensive urban expressway system, ultimately green-lighted the project.

The Confederation Line's western half is built in a converted BRT (bus rapid transit) right-of-way. During the 1970s and 1980s, Ottawa had built an extensive BRT system, dubbed the Transitway. The western section of this was built on an abandoned Canadian Pacific line. Clearances, stations and bridges were designed for ultimate conversion to LRT, although after construction began, numerous rebuildings proved necessary. Part of the eastern section of the LRT is in the right-of-way of Highway 417.



View from the Cab, looking east at the Confederation Line's western Terminus at Lincoln Fields

The original plan was to lay tracks on streets through downtown Ottawa. However, strong objections from local merchants resulted in a 1.5-mile tunnel under Queen Street through this area. There are three underground stations, with 390-foot platforms. Surface stations are 300 feet long, with provision for future extension. The above-ground stations are quite elaborate, somewhat similar to Calgary's LRT.

The 34-car Citadis Spirit fleet represents Alstom's first North American LRV order. The carbodies were constructed at Alstom's Hornell, N.Y., plant; final assembly occurred at OC Transpo's Belfast Yard shop, in Ottawa. The facility is near the line's approximate halfway point. The vehicles draw traction power from 1,500 VDC overhead catenary. The low-floor design and overhead power collection permit future on-street alignments.

The Confederation Line interfaces with the existing north-south OC Transpo Trillium Line (Line 2) DMU operation at Bayshore Station. However, the two operations are at different levels. Tremblay Station, just east of downtown, serves VIA Rail intercity trains.



An unusual feature of the Confederation Line is the use of a “guard” at stations, even with ATO. Before the driver pushes the start button to get under way after a station stop, the guard, positioned at the front of the train on the platform, checks to make sure the platform is clear. If the train is good to go, the guard blows a pocket whistle, giving the driver the all-clear. This is useful, because even though the trains are equipped with CCTV and external cameras, they're very long (more than the length of a football field), and it's sometimes difficult for the driver to monitor the entire platform. Ottawa transit users, used to short buses, are still adapting to frequent, fast rail service. So, use of a whistle-blowing platform guard is an effective, albeit quaint, safety practice.

BUILDOUT TO 2025

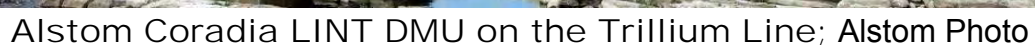
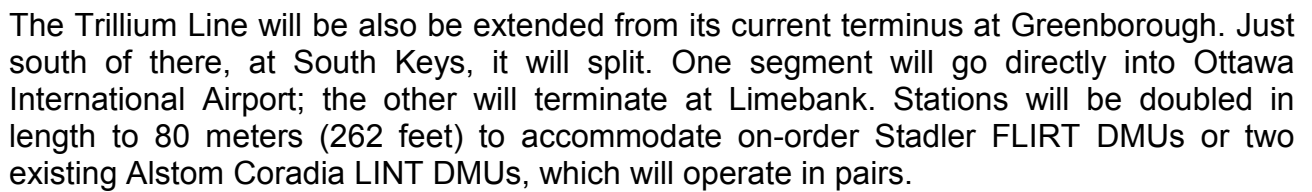
It was always intended to extend the Confederation Line eastward and westward after the initial section was open. Ottawa City Council approval has been given, contracts awarded, and work has begun.

An eastward 13-km (8-mile) extension will take service to Trim Road, in Ottawa's far eastern suburbs. It will be a surface alignment, in the median of Highway 174, and includes five new stations. Opening is scheduled for 2024.



A westward 15.5-km (9.5-mile) extension will add 11 stations. This line will split at Lincoln Fields Station. One branch, terminating at Baseline Road, will serve Algonquin College. The other, terminating at Moodie Drive Station, will serve western Ottawa. The latter will connect with the Southwest and West Transitways. A yard and light maintenance facility is planned near the Moodie terminal. Part of the route will be built in an existing Transitway, while other sections are to be tunneled. Opening is planned for 2025.

Maximum operating speed on the extensions will be 100 kmph (62 mph).





Stadler FLIRT DMU for the OC Transpo Trillium Line.

An additional 38 Alstom Citadis Spirit LRVs have been ordered for Phase Two. The first 13 are being assembled at the 16-acre Belfast Road shop, with the balance to be finished at Alstom's new plant in Brampton, Ontario. This will allow Belfast Road to focus on day-to-day maintenance of the operational fleet.

A BIT OF HISTORY



The Electroliners were a pair of streamlined, four-unit-articulated EMU (electric multiple-unit) interurban trainsets operated by the Chicago North Shore & Milwaukee Railroad between Chicago and Milwaukee. St. Louis Car Company built them in 1941. The Electroliners operated at speeds up to 90 mph. When the North Shore shut down in 1963, Philadelphia Suburban Transportation Co., known as the Red Arrow Lines, purchased and renamed them Liberty Liners. The trolley poles and steps were removed, new doors were added in the center coach sections, and third-rail contact shoes were installed for operation on the Philadelphia & Western (today's Norristown High Speed Line), where they ran until 1978, when SEPTA retired them.



SelTrac™ was originally developed in the 1970s by Standard Elektrik Lorenz of Germany for the Krauss-Maffei Transurban, an automated guideway transit system proposed for the GO-Urban network in Ontario, Canada's Greater Toronto Area. Although the GO-Urban project was never built, the Transurban technology was acquired by an Ontario consortium led by the Urban Transportation Development Corporation (UTDC), and adapted to become its Intermediate Capacity Transit System (ICTS). This technology was first used on the SkyTrain network in Vancouver, B.C., and the Scarborough Rapid Transit in Toronto. SelTrac™ was primarily supplied and developed by Alcatel, through a Toronto-based subsidiary. It is now supplied by Thales, after the company purchased many of Alcatel's non-telecommunications assets. New versions have been developed for different markets, and today SelTrac™ is used for train control systems around the world. The original SelTrac™ system was based on inductive loops that provided a communications channel as well as positioning information. In the newest, modular version, the control signal is transmitted at 2.4 GHz.

Canadian Contributing Editor John Thompson contributed to this story.

METRO NEWSLETTERS **on Technologies for** **“URBAN MOBILITY AS A SERVICE”**

**PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND
REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN
MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT,
LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN,
COMMUTER-RAIL, MONORAIL, AERIAL ROPEWAY, BOTTOM
CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE
MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD
CARS**

**TRANSPORT TECHNOLOGIES AND ECONOMIC DEVELOPMENTS IN
MODERN URBAN/MEGAPOLIS ENVIROMENT**



Artist's Impression of Bangalore Metro Station

METRO Newsletter by Dr. F.A. Wingler

METRO 95, January 2020

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

CONSIDERATIONS FOR LIGHT RAIL TRANSITS IN INDIA, “*METROLITE*”; India

By Dr. F. A. Wingler, Germany
December 2019

If one looks at the Indian governmental specifications for “*METROLITE*” - “**Standard Specifications of Light Urban Rail Transit System- METROLITE**”, one can make out, that the laid down specifications are borrowed from various world-wide LTR Systems in operation.

LRT has a wide spectrum, from the 2 ½ feet Narrow Gage public transport system, the Waldenburger Regional LRT in Canton Basel, Switzerland:



over the dense Street Tramway System on Meter Gauge in Zurich, Switzerland:



the Standard Gauge LRT City Tramway System in Karlsruhe, Germany, running interoperable in dual mode as Street Tramway as well as Commuter Rail on the governmental main railway line for regional transport between city-centres:



to the Los Angeles high capacity LRT, USA running on streets as well on reserved tracks:



or the **High Capacity Light Rail, or HCLR**, in Ottawa, Canada picking up the electricity from overhead catenary as well from a bottom feeding system, see newsletter **METRO 94**:



Interoperability of LRT with Metro Rail and Main Line Railway is determined by the Gauge. Some **Metro Rails** in Indian run on Broad Gauge, some on international Standard Gauge. For **METROLITE** Standard Gauge and for the **NCRTC/RTS** Broad Gauge are envisaged. The different track gauges will make interoperability in India problematic. The swift from 750/1000 V DC to 25 kV AC electric feeding is nowadays no technical problem

Up to now the only operating LRT in India is the Kolkata city tram. However **METROLITE** is on the way to come in Indian cities as a more cost effective and versatile public transport solution, other than **METRO RAIL**.

Metrolite to replace Metro Rail Projects in smaller Cities; India

13th June 2019 Hindustan Times Lucknow

Kanpur and Agra may be the last Metro Rail Projects in Uttar Pradesh, given Centre's Push to opt for less Capital intensive and more Cost-effective Light Rail Transit (LRT) for Tier-II and -III Cities

LUCKNOW: Kanpur and Agra may be the last metro rail projects in Uttar Pradesh given Centre's push to opt for less capital intensive and cost-effective Light Rail Transit (LRT) system for tier-II and tier-III cities.

The first indication of this policy shift came in the form of nod to a ropeway project by

the UP government for Varanasi. "Kolkatta has tram and Mumbai an operational LRT. No city so far in the country has tried ropeway or cable cars as a mode of public transport. Varanasi would be the first city to try it. The sky taxi system, however, has been great successes in cities rich in architectural and cultural heritage in Europe," said

a housing department official.

The trend for a lighter mode of public transport is likely to be followed in Gorakhpur, Prayagraj, Jhansi and Meerut where metro rail projects have been proposed by the UP government.

"We have submitted the Detailed Project Report (DPR) for

rail

Gorakhpur. It is yet to be cleared by the state cabinet but the proposal is for LRT and not the conventional metro rail project," said the official. Only last week the Ministry of Urban Development announced that it has formulated a plan for LRT or Metrolite rail system to replace the conventional metro rail system for

THE TREND FOR A LIGHTER MODE OF PUBLIC TRANSPORT IS LIKELY TO BE FOLLOWED IN GORAKHPUR, PRAYAGRAJ, JHANSI AND MEERUT WHERE METRO RAIL PROJECTS HAVE BEEN PROPOSED BY THE UP GOVERNMENT.

Smaller cities. The draft is being vetted by the railway ministry and would be finalised soon, he said.

"The existing Metro Rail Policy provides for rigorous assessment of new metro proposals and suggests an independent third party assessment by agencies to be identi-

fied by the government like the Institute of Urban Transport and other such centres of excellence," he said. According to him, Mini Metro Rails were most suitable for tier-III towns, such as Varanasi and Gorakhpur, since they were cost-effective and economical projects compared to regular or medium sized metros.

"Presently, all operational metro rail projects in India barring Delhi Metro are medium metro projects, since their passenger carriage capacity is low," he pointed out. As of now, three UP towns have operational metro rail services, including Noida, Lucknow and Ghaziabad.

Varanasi will be the first 'Transport Hub' of the Country; India

By Urban Transport News; 19/06/2019



Ring Road and Babatpur Airport Road in Varanasi

Varanasi (Urban Transport News): Prime Minister Narendra Modi's parliamentary constituency Varanasi will be the country's first transport hub. Transport services of water, land and sky will meet at the same place. If everything is okay then these three services will be started soon.

The exercise of tackling the problem of Varanasi's demolished traffic jams has accelerated. With **smart traffic management**, **smart surveillance system** and **smart parking**, as well as the preparation of a **transport hub** under the **public transport** platform, it has increased.

Under the different transport hubs of its kind in the country, public transportation facility will be available in Road, Rail, Ganga, Ferry service and Ropeway. For this, the Center and the State Government have asked all the departments to submit the plan as soon as possible. Under the Comprehensive Mobility Plan, the reconnaissance venue is set to be built on the Western Ghats near Rajghat bridge.

It takes two hours for people who come in different areas of the city and those who come to the nearby district or Bihar to change themselves to BHU Hospital in many places. If the ferry service starts, it will take half an hour and the journey will be completed in just Rs 15-20. Due to the pressure of vehicles on the city streets, the problem of jam will be substantially exhausted.

The proposed Transport Hub site is connected to Varanasi-Chandauli GT Road, Outer Ring Road Phase-3 and the main route to the city, then the Central Government's dream project is from Varanasi. Haldia is being developed as a major center of ferry service under Ganga Water Transportation. The work to upgrade the Kashi railway station, which is only a short distance, has already begun. Doppelmayr of Austria, the world's largest ropeway-maker, has also set the route of Rajghat to start the Ropeway service for public transport. There is also an offer to the Inter Model bus stand.

For the first time in the country as a public transport [ropeway](#) will start from Varanasi. Town Planner Manoj Kumar of Development Authority said that the first route fixed by the Austrian company [Doppelmayr](#) carried out the survey by reaching the end of the old Kashi from Rajghat to Machodhari, Vishweshwarganj, Madagin, Chowk, Godavali, Sonarpura, eighty, second end, eighty and BHU. Have done Another route is proposed from BHU and Cantt to Maldahiya, Lahurabir and Madagin. Doppelmer has asked to start the system on a route under the Poylet Project. Rope-Way will be cheaper many times than [Metro Rail Project](#). While the cost of construction of one kilometer for the metro is 350 crore, the ropeway and the cable car is only about Rs 50 crore.

For the passenger ship running (ferry service) on the Ganges waves, the work of making the passenger platform between the first model of the Ganga Water Highway, from the first model to the Varanasi terminal, Rajghat has begun. Passenger Jetties are being manufactured on behalf of the [Inland Waterways Authority of India \(IWAI\)](#), along with the Varanasi terminal, Assi, Lalita and windows ghats. Further, half a dozen other major Ghats will also be linked to this service. Talking with private companies for small passenger ships is going on.

Vishwanath Corridor (Vishwanath Dham), built in 39 thousand square meter area under the expansion of Kashi Vishwanath Temple will become the main center of the ferry service. After the construction of the corridor from Lalita Ghat, there will be direct connection to the temple from there. Then through the ferry service devotees will reach Rajghat or the Western Ghats at one end and Lalima Ghat, directly from Ramnagar on the other end, will reach the temple from there. They will not have to deal with the city's jam.

UTES finalise Rs 12,000 Crore Light Metro and Ropeway Projects for Varanasi; India

By Urban Transport News; 29/12/2019



Artists's Impression of suspended and Rope pulled Automated People Mover or Pod-Taxi Monorail for Varanasi

Varanasi, India (Urban Transport News): After receiving in-principal approval from Prime Minister's Office for Urban Transport system in Varanasi, the RITES Limited has now finalized the routes of light metro rail and ropeway project.

The Light Metro and ropeway facility will be available on the outskirts of the city. The old city i.e. Pakka Mahal is kept separate from it. The Ministry of Urban Development has given the funding consent to the Comprehensive Mobility Plan (CMP) after the in-principle approval of the Prime Minister's Office (PMO). The route and the action plan laid down before the project was approved, were presented by the RITES officials in a meeting chaired by the commissioner.

RITES has submitted a draft project report which is pegged at Rs 12,000 crore for smooth traffic by 2041 assuming the city's population to be 38 lakh. This will also provide direct and indirect employment to a large number of unemployed people.

According to the proposal prepared by RITES, the light metro will operate from BHEL to BHU in Tarna. It will have 14 to 16 stations. At the same time, the route of the ropeway will be from the main Godoulia intersection of the city to Rath Yatra, beyond the Varanasi railway station to Khidkia Ghat. There is a plan to build the first Transport Hub site of its kind first time in the country at Khikkia Ghat. Apart from this, the route is proposed through the Varuna Corridor from Windows Ghat to Cantt. RITES has also proposed to operate common buses including rapid buses in the city.

Commissioner Deepak Aggarwal said that RITES officials have also been asked to include in the project the running expenses of the light metro, ropeway, estimation of revenue from traffic. Care should also be taken in terms of the weight of the bag, suitcase, etc. with the passenger in the traffic medium.

Hyperloop, Metro and Pod-Taxi Ride in the India can soon become Reality; India

By Krishtina D'Silva; 27/07/2017; Urban Transport News



Artists's Impression of suspended Monorail and Rope pulled Automated People Mover or Pod-Taxi

New Delhi: Mass Rapid Transportation Technology like Hyperloop, Metrino and Pod Taxi can soon become a reality in India. The Policy Commission has approved the Transport Ministry's half-a-dozen proposals to find alternate options for public transport in the country. After getting the green signal from the policy commission, the Transport Ministry has formed a six-member committee headed by a former railway officer to study the safety standards associated with these technologies.

A senior official of the Policy Commission told that the Commission has approved these proposals with the condition that before commencing commercially, the ministry will run all these trials of technology and security measures will be adopted for them.

A senior official of the Transport Ministry said, "These new technologies can change the way people travel in cities within the country. Due to no such technology being present in India, it is necessary to know and ensure its adherence to its Global Safety Standards. The safety of passengers is also very important for pilot project.

The Ministry of Road Transport and Highways had sought approval from the Commission for the Experiment for Six New Mass Rapid Transportation Technologies. These include Hyperloop, Metrino, Pod Taxi, Hybrid Bus and Freight Rail Road. The current problems of public transport in the country are not solved by the problem of increasing traffic and this is why new technology is being considered. Some of these cost less than the current options. After testing the safety standards of these technologies and their trial run is successful, some of these can be run by the end of next year, including the Metrino.

“The cost of some technology like metrology is about 10% compared to the metro and due to this, the cost will also be benefited with them. However, technology like Hyperloop can take some time but we would like to bring them in India. He said that there is a proposal to give land for the hyperloop project. In hyperloop transport mechanism, a pod like a bike is run through a tube. Elevated corridors will be built with Freight Lines in Freight Red Road, where freight trucks can be kept and after that they will be able to move at a faster pace. This will reduce the time of carrying goods and more goods will be sent.



Suspended Mono-Rail Guide-Beam Pod-Car Project for Dubai for Connectivity in Business Centres

Reliance Industries decides to pick Stake in “*SkyTran*” to improve Transportation Services; India

The Company's Efforts are visible as it currently has eight approved Patents and over 40 Patents pending approvals globally, including India.

By Anushka Khare; 22/10/2018 ; Urban Transport News



Artist's Impression of Reliance "SKYTRAN" – a Personal Transit in Business Centres

New Delhi/Urban Transport News: Recently the Reliance Industries (RIL) has shifted its focus from traditional to futuristic businesses which could improve the quality of life and make the business relevant for the future. In light of this, it had launched Jio services last year driven by VoLTE technology, an advanced technology to transfer calls over data networks.

The Reliance Industrial Investments & Holdings (RIIHL), a wholly-owned subsidiary of RIL, has acquired a 12.7 percent shareholding (on fully diluted basis) in SkyTran, a technology-driven company focusing on public transportation, with an option to further invest up to \$25 million in convertible notes, subject to approval from SkyTran's board on October 17.

SkyTran Business

SkyTran is a venture capital and private office company which aims to provide personal transportation systems through the use of magnetic levitation technology, aimed at solving the problem of traffic congestion globally. It has partnered with National Aeronautics and Space Administration (NASA) in the US and Israel Aerospace Industries (IAI) to develop the required technology.

Road traffic has become one of the biggest menace impacting the quality of life and economic development across the globe. SkyTran aims to solve the problem by developing a transport option that is high-speed scalable and available at a low cost.

The company's efforts are visible as it currently has eight approved patents and over 40 patents pending approvals globally, including India.

In fact, SkyTran has received funding from well-known names like Google Chairman Eric Schmidt, who are reputed figures in the technology space. It had received funding from the US Department of Transportation as well.

Partnership with RIL

With the focus on futuristic technologies, RIL aims to have an exclusive partnership with SkyTran in India to develop a rapid transport system to avoid traffic congestion and change the face of transportation in the country. It will also help alleviate the problem of pollution in India.

RIL's management said it is well-poised to capitalize on its existing business portfolio and capabilities to accelerate development of SkyTran across the world and especially in India with an aim to improve quality of life.

India's first Metrino Pod Taxi "MISTER" on the Way, to follow US Safety Norms; India

By: [PTI](#) | New Delhi | Updated: December 26, 2017 7:13:46 PM

The much-awaited India's first pod taxi project has moved a step closer to reality after a high-level panel recommended inviting fresh bids for the same conforming to the strictest safety standards on the lines of those prescribed by an American body.



Artist Conception for METRINO "Metropolitan Individual System of Transportation on Elevated Rail", MISTER: Suspended Monorail Pod Taxi Personal Rapid Transit, PRT

The much-awaited India's first pod taxi project has moved a step closer to reality after a high-level panel recommended inviting fresh bids for the same conforming to the strictest safety standards on the lines of those prescribed by an American body. The projected Rs 4,000-crore pod taxi scheme — also known as **Personal Rapid Transit (PRT)** — is a dream project of Road Transport and Highways Minister Nitin Gadkari, and the NHAI has been mandated to execute it on Delhi-Gurgaon pilot corridor (12.30 km) from Delhi-Haryana border to Rajiv Chowk in Gurgaon on a PPP (public-private partnership) basis. "The committee recommends issuance of a fresh EOI (expression of interest) incorporating (automated people movers) APM standards and specifications, along with other general safety parameters with Niti Aayog recommendations," the five-member committee set up for technical and safety standards of PRT, headed by transport expert S K. Dharamadhikari, said.

The ambitious project has been plagued by delays as government think-tank Niti Aayog raised some red flags, asking the highways ministry to direct initial bidders to prepare a 1-km pilot stretch as all the technologies were unproved. Subsequent delays were caused due to formation of the high-powered committee to lay down safety and other specifications. "We will be issuing bids very soon for the pod taxi project now, with all hurdles cleared. The safety and security concerns will be taken care of as per the recommendation of the committee. This will be a major step towards easing congestion on busy Dhaula Kuan-Manesar stretch and revolutionising transportation," Gadkari told PTI.

PRT is an advanced public transport using automated electric pod cars to provide a taxi-like demand responsive feeder and shuttle services for small groups of travellers and is a green mode of uninterrupted journey. The committee in its report, a copy of which is with PTI, also recommended framing of request for quotation (RFQ) based on discussions with interested players and stressed the need for evaluation, based on performance in the test sections.

The automated people mover (APM) standards in the US as recommended by the committee for the maiden **Personal Rapid Transit, PRT**, in India have been prepared by the American Society of Civil Engineers (ASCE) and these constitute the minimum requirements for an acceptable level of safety and performance for the PRT. "The APM standards include minimum requirements for the design, construction, operation and maintenance of the various sub-systems of an APM system and are in general relevant for a PRT," the committee said.

These include vehicle arrival audio and video visual warning system, platform sloping, evacuation of misaligned vehicles, surveillance/CCTV, audio communication, emergency call points and fire protection, among other advanced systems, it added.

The pilot project, to be taken up on design, build, finance, operate and transfer (DBFOT) basis, is meant for a 12.3-km stretch from Delhi-Haryana border on NH 8 (near Ambience Mall) to Badshahpur via Rajiv Chowk, IFFCO and Sohna Road. The model is in place in London's Heathrow airport, Morgantown and Masdar city.

Earlier, three global companies, including New Zealand's Metrino Personal Rapid Transit that later called off its joint venture with Indian partner Gawar construction, were picked during initial bids for the project. Metrino, along with PNC-SkyTran and Neel Metal Products Ltd, had bid for the pod taxi project last year. The companies were to build 1 km of pilot stretch to showcase their technology. The standards approved will also play a role in guiding safety and other specifications for states interested in such projects, including Punjab.

Three bidders had made technical presentation to the government last year — Neel Metals Product Ltd-Ultra Personal Rapid Transport (technology partner), Gawar Construction-MIPL, which later said that instead of Metrino, they are roping in LSD by MND Group, and PNC-SkyTran that provided details of specifications in the prototype being developed for commercial operation in Israel. If all goes according to plan, the first phase will be linking the 70 km stretch from Dhaula Kuan in Delhi to Manesar in Haryana to decongest NCR, Gadkari said.

Green Signal for Metro Neo Project in Warangal; India

Hyderabad Metro and HMDA Officials visited Warangal at the Directives of Minister KTR. Metro Proposals, DPR Manufacturing, and other Issues were reviewed by Officials..

By **Kanika Verma**; 24/12/2019; Metro Rail News

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89



Green signal for Metro Neo Project in Warangal

WARANGAL (Metro Rail News): The bureaucracy is focusing on the [Metro Neo Rail](#) proposals that will be built to connect Tri-Cities, Kazipet, Hanamakonda, and Warangal. Minister of State for Urban Development and IT, KTR, recently met with the Metro officials on the Warangal Metro Neo Project.

[Hyderabad Metro](#) and HMDA officials visited Warangal at the directives of Minister KTR. Metro proposals, DPR manufacturing, and other issues were reviewed by officials.

Since Warangal city is expanding day by day and with inadequate RTC buses, People are increasingly using autos and own vehicles. The government has decided to start the metro project in Warangal, the largest city in Telangana, after Hyderabad.

HMDA Transport Head Vijayalakshmi and HMDA Deputy Director SK Sinha along with Ajit Reddy, the head of HMDA's Transport Plan, conducted the field study last week and identified the facilities and flexibility along the Kazipet Railway Station to Petrol Pump,

Hanmakonda Chowrasta, Mulugu Road, MGM Center, Pochamma Maidan, Kashibugga, Venkatrama Junction to Warangal Railway Station, from thence to Warangal Station Road. Advertisement.

HMDA officials have revealed details of the Metro project through PowerPoint Presentation. The Union Urban Development Ministry and the Maharashtra Government have jointly launched the Metro project in Nashik recently. The Central and State Governments will need 50:50 funding for the **New Metro Neo Project**. He also said that 60 percent of the funds can be borrowed from [public-private partnership \(PPP\)](#) systems and global financial institutions.

The remaining 40 percent of funds are to be spent by the Central and State Governments. Government Chief Whip Vinay Bhaskar said that the Metro project should be prepared to keep the population and road congestion in view.

The proposed metro line for the connects the route between Kazipet Railway Station and Warangal Railway station passing through Fatimanagar, Subedari, Nakkalagutta, Ambedkar Junction, Petrol Pump, Hanmakonda Chowrasta, Mulugu Road, MGM, Pochammaidan, Kashibugga, Venkatrama Junction. The locals are welcoming the move as there is traffic congestion in the district with an increase in population.

Dehradun to become the first City in the Country to have Ropeway as Mass Transit System; India

DMRC would study the Project Feasibility and hand over a Detailed Project Report (DPR) to the State Government in five Months.

By **Kanika Verma**; 24/12/2019; Metro Rail News



Dehradun to become the first City in the Country to have Ropeway as Mass Transit System; Animation by F.A. Wingler

DEHRADUN (Metro Rail News): On Monday, the [Uttarakhand Government](#) signed a Memorandum of Understanding (MoU) with [Delhi Metro Rail Corporation \(DMRC\)](#) for setting up two ropeway projects in Dehradun.

Officials claimed that this would make Doon the first city in the country to have ropeway as a mass transit system. The officials added that DMRC would study the project feasibility and hand over a detailed project report (DPR) to the state government in five months.

Initially, the government had planned to link Dehradun, Haridwar, and Rishikesh with a metro train and a separate entity named Uttarakhand Metro Rail, Urban Infrastructure & Buildings Construction Corporation Limited was also set up for the purpose.

However, a study found that it was not feasible to have a metro in most places in these three locations. Following this, the state government decided to have ropeways for Dehradun, **Personal Transit Rapid or Pod Cars for Haridwar and Light Rapid Transit to connect Dehradun, Rishikesh, and Haridwar.**

According to the initial groundwork done by Uttarakhand Metro Rail staff, the total length of the two proposed ropeways would be around 25 km, which they claimed may “slightly differ” when the final DPR is prepared. The construction of a one km stretch of the ropeway would cost between Rs. 70 crore and Rs. 90 crore. The overall project cost is estimated to be around Rs 2,200 crore.

The officials added that two routes have been finalized for the project. The first one is from ISBT to Clock Tower to Rispana Bridge and the second would start near Forest Research Institute (FRI) and end at Kandoli via Clock Tower.

DMRC is expected to prepare the DPR in five months and thereafter the project is likely to be completed in another two years. Once DMRC hands over the DPR, the state would invite tender bids for the project. Each cabin car of the ropeway would have the facility to carry 10 passengers with a speed of 25 km/hour, officials said.

The MoU was signed in the state assembly building on Monday in the presence of urban development minister Madan Kaushik. Kaushik told, "The project has several advantages. Not only will it cost far less than the metro rail, but it will also be completed faster. It will have less intrusion on the ground and have less effect on the city's skyline."

He added that the ropeways need not follow the roads and therefore will reduce the traveling distance. "It will cost over Rs 2 crore to prepare the DPR, for which we have released the first installment of Rs 43.20 lakh to Delhi Metro. With this project, Dehradun will become the first city in the country to have ropeways as a mass transit system."

Cable Grip for detachable Ropeway Lifts



Detachable Chairlift Grip (Chair is on a Sidetrack)

A cable grip is a device for propelling a [vehicle](#) by attaching to a [wire cable](#) (also called wire rope) running at a (relatively) constant speed. The vehicle may be suspended from the cable, as in the case of [aerial lifts](#) such as a [gondola lift](#) (télécabine), may be guided by [rails](#), as in a [cable traction railway](#), or may be self-guiding, as in a [button lift](#). Typically, multiple vehicles will use the same cable; where just one or two vehicles are in use they will tend to be attached to the cable permanently (e.g. [funiculars](#)).

While the cable grips used in the original cable railways were manually operated, requiring considerable skill and strength, modern cable grips tend to be automatic. Given that the cable runs at a relatively constant speed, accelerating the vehicle to match the speed of the cable presents a technical difficulty; possible methods are to apply the grip gradually, to accelerate the vehicle (e.g. by guiding wheels) prior to applying the grip, or to use a sprung linkage between the grip and the vehicle. Also, the cable needs to be able to handle friction from the grip and increased load while the vehicle is accelerating.

The Eppelsheimer Bottom Grip

This is the type of grip used in the cable cars of [San Francisco](#). The grip is attached to the lead truck of the car (or both trucks, in the case of double-ended cars), and is a [field-replaceable unit](#). While there have also been side grips and even top grips, the sheer

number of rope changes, crossings, and "let-go" curves make a bottom grip, i.e., one in which the jaws open directly downward, the most practical type of grip.

The operating lever raises and lowers the center plate of the grip, which in turn operates the jaws. With the lever fully forward, the grip is open, and the cable is free to fall out (necessary when the cable crosses under another line, as well as at the ends of lines, and at "let-go" curves). With the cable lifted into the jaws, the operating lever is pulled back, forcing the jaws between two fixed rollers, and capturing the cable between the grip's replaceable mild-steel dies (but without applying pressure). To start moving the car, the operating lever is pulled back further, squeezing the cable between the dies.

The grip was designed by the German railway mechanical engineer [William Eppelsheimer](#) in around 1880.[1]

See also: [Andrew Smith Hallidie](#).

Vehicles using Cable Grips Suspended:

[Gondola lift](#) (télécabine)

[Detachable chairlift](#)

On Rails:

[Cable traction railway](#)

[People mover](#)

Self-guiding:

[Button lift](#)

Manufacturers:

[Poma](#)

[Doppelmayr CTEC](#)

Committee formed to assess Land and Structures for Jammu Light Metro; India

By Anushka Khare; Urban Transport News

Jammu, India (Urban Transport News): The Divisional Commissioner of Jammu, Sanjeev Verma has constituted a committee for assessment of land and structures for [Jammu Light Metro](#) projects.

On Saturday, a meeting was called by Divisional Commissioner to discuss the progress of the light rail metro project for Jammu city and the decision was taken to speed-up the work according to the plan.

In the meeting, the officer concerned gave a detailed presentation on the project and informed the Division Commissioner about the proposed plan of elevated [light metro corridor](#) in Jammu which will connect Bantalab to Bari Brahmana Railway Station with a total length of 2 km in Phase I and Exhibition Ground to Udheywala and Exhibition Ground to Satwari Chowk in Phase II.

The new constituted committee will be headed by Deputy Commissioner Jammu, comprising Sub Divisional Magistrate, South, North, PWD Engineers, PDD, PHE and officers of other concerned departments for identification of land and structures to determine the exact quantum of land to be acquired for the execution of Jammu light metro project.

The Divisional Commissioner also asked for identification of locations for business, households, institutions assessment of area and structure falling under the Jammu light metro project.

Later, the Divisional Commissioner reviewed the up-gradation plan for Sabzi Mandi Parade and a threadbare discussion was held regarding the up-gradation plan which includes the creation of space for parking, designing of shops and other aspects.

The Divisional Commissioner directed all concerned officers to conduct a joint visit for initiating actions for the up-gradation of the Sabzi Mandi Parade.

Earlier, the Divisional Commissioner also reviewed the beautification work of Tawi front and reviewed issues of construction of approach lane, painting of flyover poles, beautification of ghats, installation of lightings along Tawi Banks, the establishment of railing on Tawi Bank and cleaning of sitting space near the temple were discussed in the meeting.

In November 2019, the J&K Economic Reconstruction Agency (JKERA) and Railway consultancy firm RITES Limited had signed a memorandum of understanding (MoU) to prepare a comprehensive mobility plan and detailed project report (DPR) for proposed [Jammu](#) and [Srinagar Light Metro](#) Rail project.

The meeting was attended by Deputy Commissioner Jammu, Sushma Chauhan; CEO Mass Rapid Transit Corporation, Jammu & Metro Rail Transport Corporation, Kumar Rajeev Ranjan; Senior Superintendent of Police Jammu Tejinder Singh, Sub-Divisional Magistrate South Srikant Suse, ACR Jammu Vijay Sharma besides senior functionaries of Jammu Municipal Corporation (JMC), Jammu Development Authority (JDA) and other concerned officers.

Srinagar-Jammu Light Metro Project worth Rs 9,590 Cr. to start by Sept. 2024; India

Metro Rail News, December 2019, p.10



Artist's Impression of Light Metro

The Jammu and Kashmir government has set a September 2024 deadline to start operations on the Rs 9,590 crore metro project for twin cities of Jammu and Srinagar, an official spokesperson said on November 29, 2019. Lieutenant Governor Girish Chandra Murmu chaired a meeting here on November 28, 2019 evening to review the proposed Mass Rapid Transit System (MRTS) and the Light Rail Projects for Jammu and Srinagar.

Dheeraj Gupta, principal secretary, Housing and Urban Development department gave a detailed presentation on the Light Rail Projects in Jammu and Srinagar.

During the meeting, it was informed that the project costing Rs 9,590 crore is expected to commence operations by September 2024, the spokesman said.

It was also informed that the Light Metro Elevated Corridor in Jammu will connect Bantalab to Bari Brahmana Railway Station (Corridor-1) with a total length of 23 km in Phase-I and Exhibition Ground to Udheywala (Corridor-1) and Exhibition Ground to Satwari Chowk (Corridor-2) in Phase-II, he said.

Similarly in Srinagar, Indra Nagar to HMT Junction (Corridor-1) and Hazuri Bagh to Osmanabad (Corridor-2) each having a length of 12.5 km and Indra Nagar to Pampore Bus-stand (Corridor-1) Hazuri Bagh to Airport (Corridor-2) will be taken up in Phase-I and II, respectively, the spokesman said.

The Lieutenant Governor emphasized on the linkage of Light Metro stations with tourist destinations and places receiving high footfall.

He directed the officers to prepare a plan for the clearance of Right of Way (RoW), land acquisition and other such matters.

For successful implementation of the mega project, the LG observed that the planning and development of Mass Rapid Transit should be timed with the growth in travel demand.

AIIB to lend \$500 Million to Mumbai Suburban Commuter Rail; India

Metro Rail News, December 2019, p.13



Mumbai *LOCAL* Suburban Commuter Rail

The Asian Infrastructure Investment Bank (AIIB), a multilateral development bank, has committed to lending \$500 million to expand Mumbai's suburban railway network, a senior executive announced here on 15 Nov 2019. This brings the bank's total investments in India to \$2.9 billion.

The project involves quadrupling of Virar-Dahanu Road corridor (64 km) to provide an extension of the Suburban railway service to connect peripheral areas with Mumbai. The project will also see the construction of a new suburban railway corridor between Panvel and Karjat (28 km), said AIIB's DJ Pandian, vice-president and chief investment officer.

Rapid Rail', faster than Metro, to connect Bhopal and Indore by Regional Rapid Transit System, RRTS; India

Metro Rail News, December 2019, p.13



Artist's Impression for RRTS

Madhya Pradesh government is planning to launch rapid rail, faster than the Metro trains, in a bid to improve intra-state connectivity. MP Urban Development Minister Jaivardhan

Singh told reporters the plan was to run rapid rail between Indore- Ujjain, Indore-Pithampur and Indore-Dewas. The detailed project is being developed in coordination with the Delhi Metro Rail Corporation (DMRC). DMRC has been asked to carry out a feasibility study. We have asked DMRC to study its feasibility & PTI quoted Jaivardhan Singh as saying. We are going to plan a metropolitan area involving Bhopal and Indore as both cities are expanding rapidly. It is important areas around these two major cities are **developed into satellite townships**, he further said.

Singh informed that the first tranche of metro rail funds for the state has been sanctioned and would be received by next month. He said the draft for this plan has been charted out and final talks were underway with the rural development department since some of the areas are rural pockets.

Delhi Metro Snag: Thousands stranded, Traffic Chokes Delhi-Gurgaon Highway as Yellow Line collapses; India

The Yellow Line of Delhi Metro collapsed on Tuesday Morning after a technical Glitch. Thousands of Commuters were left stranded inside the Metro and on Roads.

India Today Web Desk; New Delhi
May 21th, 2019; UPDATED: May 21th, 2019 14:51 IST



Passengers get off the stranded Yellow Line Train near Outub Minar Station.

Thousands of commuters were left stranded inside Delhi Metro stations and the roads outside when services on the Yellow Line was disrupted for several hours on Tuesday morning.

Traffic snarls were seen all the way from Gurgaon to Delhi while Delhi Metro Rail Corporation (DMRC) officials rushed to fix the technical glitch that led to the crisis.

Hundreds of people were seen standing on the roads waiting for some mode of transport and battling the sweltering heat.

Trains on Yellow Line, that connects Huda City Centre in Gurgaon to Samaypur Badli in Delhi, was disrupted at 9:32 am, and normal services were restored around 3 pm.

Power Failure halts Mumbai Monorail Service for three Hours; India

Updated: 15 Mar. 2015, 09:03 PM IST PTI

MMRDA says the Services got disrupted due to tripping of Power at around 8am.



A stranded Monorail between Mysore Place Station and Bhakti Park in Mumbai March 2015; Photo: PTI

Mumbai Monorail Service collapsed for three hours due to power failure, leaving 11 people including a train captain stranded inside near Bhakti Park in Wadala area.

None of the passengers was injured in the incident and they were evacuated safely by fire personnel who used snorkels to bring them down to ground from the elevated track.

The incident prompted chief minister Devendra Fadnavis to order an inquiry under principal secretary (Urban Development). According to Mumbai Metropolitan Region Development Authority (MMRDA), one of the implementing agencies of the project, the services got disrupted due to tripping of power at around 8am.

"The services experienced a power disruption between Bhakti Park and Mysore Colony stations at around 7.58am as the trains were not receiving the 750V DC electricity, that powers the trains," MMRDA said in a statement.

Due to this, two trains — one heading towards Bhakti Park station and the other leaving from there — got stuck there. The power could be restored for a short while at around 8.20 am following which one of the trains reached Bhakti Park station. The other train got stuck again between Bhakti Park and Mysore Colony stations, as the power tripped once again, and another train could not be brought to rescue the stranded train and hence the fire brigade was called to conduct train-to-ground passenger evacuation, the release said.

A fire brigade official said they got call about the incident at around 9am and rescued 11 people in subsequent rescue operation. "We got a call at around 9am about the incident and immediately our rescue team reached the spot and we have managed to rescue 11 people," a fire brigade official said.

All passengers were safely evacuated with no injuries or medical emergencies reported. Power was restored at about 10:45 am. The stranded train was able to move on its own power, he said.

The official added that services resumed after 12 noon, after tests and trials were conducted for the entire system including movement of trains without passengers.

Taking note of the incident, Fadnavis posted on twitter: "Looking into Mumbai to immediately initiate an enquiry."

The Phase I of the Mumbai monorail became operational in February last year between Wadala Depot and Chembur in the metropolis. It is the first such service in the country.

60% of Delhi Metro now powered by Solar Energy from Madhya Pradesh; India

FEATURE STORY of World Bank June 5,



More than Half of Delhi Metro now runs on Solar Power coming all the Way from Rewa in Madhya Pradesh. This means that 290 Trains across 373 km serving 2.6 Million Passengers in a single Day are now green.

The 1,590-acre Ultra Mega Solar Park in Rewa's Gurh tehsil is among the largest single-site solar power plants in the world. And 24 percent of the park's solar energy is being sold directly to the Delhi Metro Rail Corporation (DMRC), meeting almost 60 percent of its daytime demand. This will essentially help DMRC not only reduce its dependence on coal, but also save Rs. 793 crore on its energy bill over the next 25 years.



The Solar Park in Rewa is among the World's largest single-Site Solar Power Plants spread over 1,590 Acres

The Madhya Pradesh Power Management Company Ltd, which supplies power to the state electricity distribution companies, will get the remaining 76 per cent of the power produced from the Rewa solar power plant. An innovative scheduling exercise has enabled the solar plant to provide preferential uninterrupted power supply to Delhi Metro first, even on the days without optimum sun availability.

World Bank Group Support

The park, with an installed capacity of 750 megawatt, has been made possible with support from the World Bank and Clean Technology Fund through a US\$ 18 million funding as part of a Shared Infrastructure for Solar Parks Project. The International Finance Corporation was the transaction advisor for the project.

The project will contribute immensely towards India's aim of quadrupling its renewable energy capacity to 175 gigawatts (GW) by 2022, including 100 GW of solar power. The Indian government's plan to ramp up solar power generation is among the largest in the world and will help bring sustainable, clean, climate-friendly electricity to millions.

The park will add 2.5 percent to India's total installed solar capacity. It also aims to reduce greenhouse-gas emissions by 1.3 million tons every year and nearly double the state's capacity to generate solar power.

The World Bank-Clean Technology Fund loan financed shared infrastructure facilities including a transmission evacuation system, which ensures the power generated is immediately evacuated to the grid for distribution. Moreover, the solar power has been developed on an unsubsidized basis, underscoring the World Bank Group's commitment to sustainability.

Role of Private Sector

One of key innovations, that stands out in this project, is how a modern and transparent electronic competitive bidding process, that went on for 33 hours achieved first-year tariffs of as low as Rs. 2.97 per unit. This has essentially brought down the cost of solar power to compete with that of coal-based power.

This was also the first time that international players participated in a state bid.

"For the first time, the price of solar power has been brought down to less than Rs. 3 per unit with the use of a modern and transparent bidding process," said Junaid Ahmad, World Bank Country Director in India, adding, "We hope this will further open up a vibrant market for solar investments in India."

The World Bank Group's involvement in the project has helped in further leveraging private-sector investment worth USD 575 million in solar photovoltaic assets.

The project has demonstrated important economies of scale in solar generation, pushed down transaction costs for private players, and increased efficiency while further reducing unit costs of solar power.

"The World Bank investment in the solar park in Rewa has helped boost market confidence in the Indian solar sector in a major way. The park has managed to catalyze commercial funding, contributing towards India's ambitious target of installing 100 GW of solar power capacity by 2022," said Surbhi Goyal, Senior Energy Specialist and World Bank's Task Team Leader for the project.

The model of the Rewa Solar Power Project has been included in Prime Minister's Book of Innovation 2017 and awarded World Bank Group's President award for Innovation and Excellence.

The World Bank Group is now collectively working on replicating the success of the Rewa Solar Park in other such parks in Madhya Pradesh and possibly in Odisha.

"The park has managed to catalyze commercial funding, contributing towards India's ambitious target of installing 100 GW of solar power capacity by 2022".

Hyderabad Metro introduces QR Code-based e-Ticketing on WhatsApp; India

The QR Code-based Ticketing will allow Passengers to pre-book three different Types of Tickets, single and Return Journey Tickets for the single or two-Way Journeys, Trip Pass and Store Value Pass.

By **Kanika Verma**; 24/12/2019; Metro Rail News



Hyderabad Metro introduces QR Code-based e-Ticketing on WhatsApp

HYDERABAD (Metro Rail Project): On Monday, Hyderabad Metro Rail Limited (HMRL), in association with MakeMyTrip, announced the launch of a QR code-based e-ticketing system for metro passengers. Hyderabad Metro is the first in the country to launch the QR code-based e-ticketing system, officials said.

The QR code-based ticketing system will allow passengers to pre-book three different types of tickets, single and return journey tickets for the single or two-way journeys, Trip Pass and Store Value Pass. More importantly, the service will permit passengers to book six tickets in a single transaction and share those (six) QR codes with other passengers on WhatsApp.

Initially, the QR code ticketing service is available at 20 stations including Miyapur, HiTech city, Tarnaka, Secunderabad, Ameerpet, Durgam Cheruvu, Raidurg, JNTU, KPHB, Kukatpally, Dilsukh Nagar and LB Nagar among others. By January 2020 efforts are on to make this service available at all the 49 stations.

Passengers will be able to book 'single and return Journey ticket' and in subsequent phases, Trip Pass and Store Value Pass will be available through Make My Trip's website and app.

HMRL Managing Director NVS Reddy after formally launching the service said the new ticketing system is designed to make commuting comfortable to passengers who do not have to wait for tickets at the counters.

While sharing the QR codes with other passengers (in the loop of six), they will have to be careful that the codes are not shared with others as the codes are scanned and permitted to travel only once, he said.

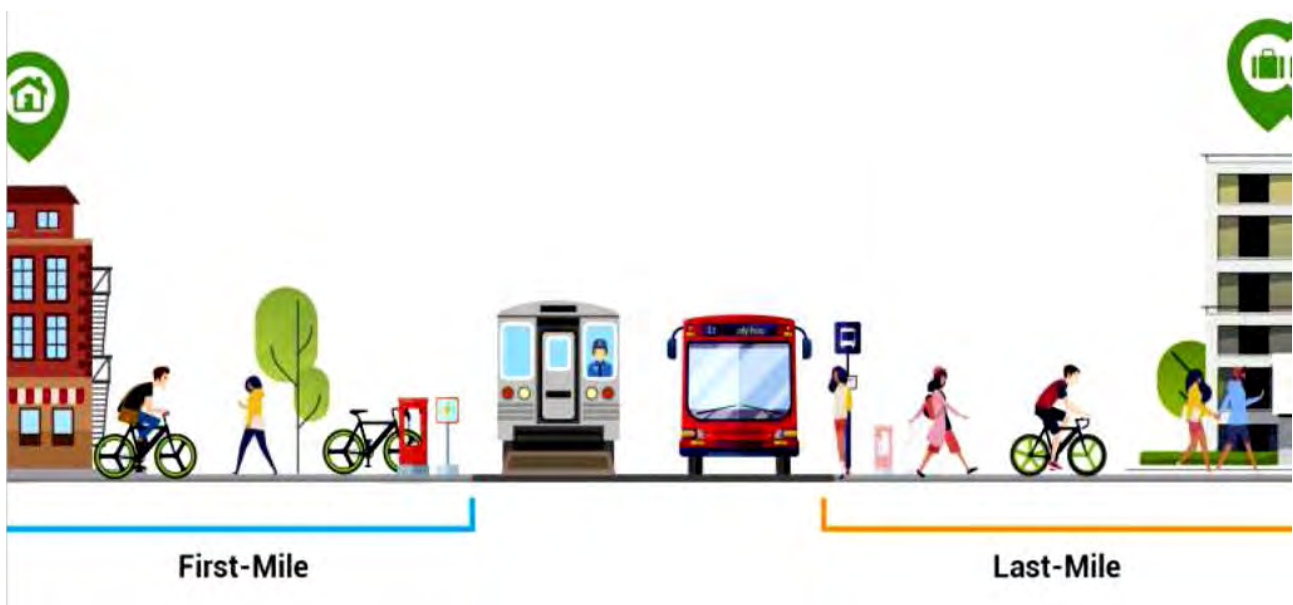
MakeMyTrip co-founder and CEO Rajesh Magow said Metro passengers generally spend about 10 minutes in queues for tickets. He said, “The QR code-based ticketing system has been specially designed for Hyderabad Metro and officials have been working on it for the last three months”.

Authorities are planning exciting offers for passengers booking their tickets using the QR code system. The CEO and MD of L&T Metro Rail Hyderabad Limited, KVB Reddy and other senior officials were present.

EXCLUSIVE INTERVIEW with Dr. E. Sreedharan

Last-Mile Connectivity attracts Commuters to the Metro Service; India

Metro Rail News, December 2019, p.22



In an exclusive interview, Padma Vibhushan awardee and the Metro man of India Dr. E. Sreedharan, speak about Metro policy, and how the government can make Metro projects play a **vital role in improving urban mobility**, reduce road accidents and pollution levels. Here are the edited excerpts.

What are some of the key digital management initiatives and how the same can benefit in terms of reducing the time and cost overrun?

It is now a fashion to mention “digital” for all progress. To me, digital means the use of computers. From this point of view, all our Metros are already digital — the signalling system, ticketing system, train management system, trains themselves, passenger information system etc. The main benefits are savings in manpower, level of safety, reliability, punctuality and passenger convenience.

What are the various Strategies to make Metro Projects more sustainable?

Metros are highly capital intensive. At the same time, ticket charges have to be kept low to make the system affordable to the common man. Therefore, the Metros will not be financially profitable. Metros can be made financially sustainable by the government,

sharing part of the capital cost, and extending duty and taxes concession. Metros should also maximise non-fare collections through advertisement, parking fees and commercially exploiting surplus lands and station areas **Last-Mile Connectivity** can attract commuters to the Metro service.

This can be done through the provision of sufficient parking areas near Metro stations, or through introducing feeder services from Metro stations to the destination points. A common ticketing system for such feeder buses can be a great attraction.

As Metros are not financially attractive, no private investors will come forward, unless an array of sweetness is offered such as viability gap funding, lands for commercial exploitation, tax and duty concessions and ridership guarantee. Passenger safety, reliability of trains and punctuality are most important in Metro operation and there is no scope for cost reduction in these areas. Metros should not be looked upon as a profit venture. **It is a social need to improve urban mobility**, to reduce road accidents and pollution levels.

Many Metros are putting green Initiatives in Place...

Green initiatives cover designing of stations and passenger amenities in such a way that power requirements are reduced. By setting up solar panels and solar farms, developing drawing of power from the grid is reduced. Landscaping of Metro stations and car depots are also green initiatives.

What are your views on developing a New Metro Ecosystem in India?

I am thoroughly disappointed with the Metro policy of our government. According to me, it is restrictive, and ring fenced without any attempt to reduce the cost of construction or boost ridership. The result is such a populous country like ours can commission only 25 km of in China.

Haryana Government plans to open two multi-modal Transit Centres in Gurugram; India

By Urban Transport News; 06/08/2019



>Gurgaon Rapid Metro

Gurugram (Urban Transport News): Haryana Government has planned to develop two multi-modal transit centres in Gurugram to link the different modes of transport. **This will help commuters to switch seamlessly between metro and the bus services.**

According to the plan, one centre will be developed in Kherki Dhoola and the second one is likely to come up in Pachgaon, Manesar. The state cabinet has already given its approval for commencing the work on these two projects. The Haryana State Industry and Infrastructure Development Corporation (HSIIDC) will arrange the land required for development of the both centres. However, Haryana State Transport department will develop the project in consultation with the Haryana Mass Rapid Transport Corporation (HMRTC).

The multi-modal transit centre in Kherki Dhoola will be developed by state transport department on 15 acres of land and the centre at Pachgaon will be developed by HMRTC on 10 acres of land near the proposed Regional Rapid Transit System (RRTS) and Mass Rapid Transport System (MRTS) stations.

Sources said that the basic design of both centres will be drawn up by the state transport department. The Gurugram Metropolitan Development Authority (GMDA), is the coordinating body for the projects.

To make the multi-modal centres easily approachable from all times to the commuters, the centres will be situated close to the metro stations.

For instance, the centre at Pachgaon in Manesar will be equally accessible from proposed RRTS, MRTS as well as Orbit Rail. These centres will also be connected with the city bus service so that the commuters can easily switch between different modes of transport as

required. The discussions are underway between the concerned authorities for the Pachgaon centre.

As of now, there are four mass rapid transit projects in the pipeline – RRTS, Gurgaon Rapid Metro, Orbit Rail and extension of Rapid Metro along Southern Peripheral Road.

The proposed Rs.4,770 crore Haryana Orbit Rail project, which would connect 130 km long city rail corridor from Harsana Kalan (in Sonapat) to Palwal, will have a total 17 stations. This corridor will pass through Badli, Manesar and Sohna and runs along the Kundli-Mansar-Palwal (KMP)

Country's first Transit-oriented Development (TOD) project in Delhi; India

Union Home Minister Shri Amit Shah kicked off Country's first Transit-oriented Development (TOD) Project under which a State-of-the-Art Infrastructure Zone will be built at Karkardooma, East Delhi, India.

By **Narendra Shah**; 28/12/2019; Metro Rail News

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Union Home Minister Shri Amit Shah Kickoff the TOD Project in Delhi

DELHI (Metro Rail News): Union Home Minister Shri Amit Shah laid the foundation stone for the country's first Transit-oriented Development (TOD) project with the aim to reduce the need to commute for work or recreation, and making urban development more sustainable at Karkardooma in east Delhi on Dec 26, 2019.

On the launch of Delhi's First TOD project Union Minister of Housing and Urban Affairs Shri Hardeep Singh Puri, Lieutenant Governor of Delhi Shri Anil Baijal and Shri Gautam Gambhir MLA, East Delhi witness the historic moment.

TOD Project to be completed by 2023

According to Mr. Dikshu C. Kukreja, managing principal of CP Kukreja Architects, which is designing the 60-acre site, the integrated development of the hub, which will bring together metro stations, residences and workplaces; and recreational spaces such as museums, is expected to be completed by 2023.

A Memorandum of Understanding (MoU) has been signed by The DDA on December 19th 2019 with the Indian Railways for development and redevelopment of the Anand Vihar station. The **TOD Policy** to be kicked off in Karkardooma will also be linked to the Anand Vihar station said, official.

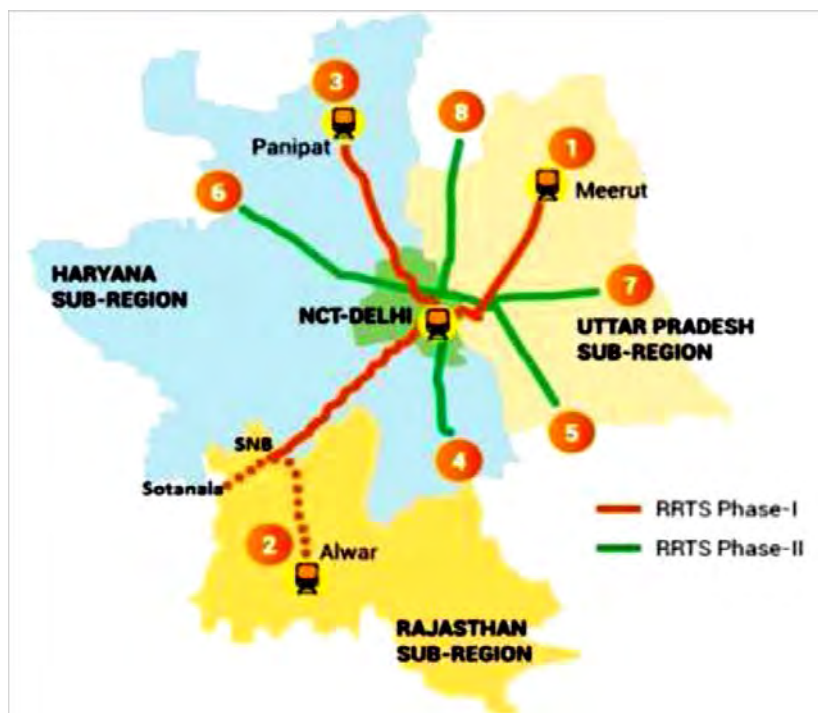
NCRTC/RRTS in India; India

Metro Rail News, December 2019, p.22;

See also [PDF]

Feasibility Report of Feasibility study for Delhi-Sonipat ...

ncrpb.nic.in › pdf_files › Feasibility Report Delhi Sonipat Panipat RRTS Cor...

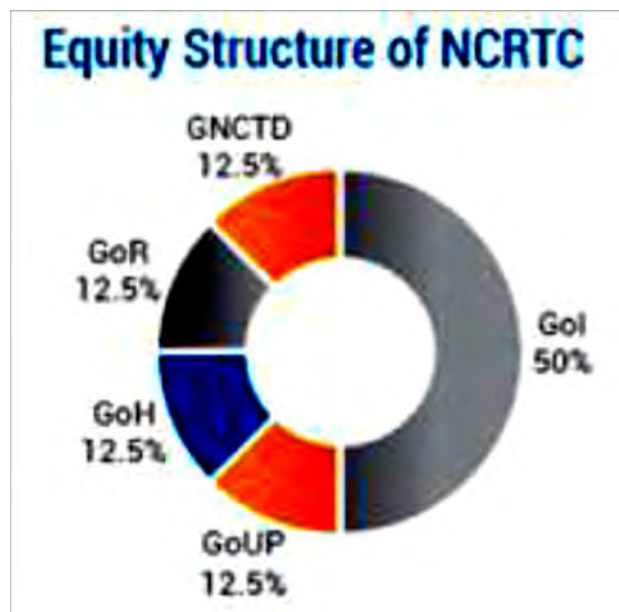


National Capital Region Transport Corporation (NCRTC) is a Joint Venture company of Govt. of India and State Governments of Delhi, Haryana, Rajasthan and Uttar Pradesh and is mandated for designing, developing, implementing, financing, operating and maintaining **Regional Rapid Transit System (RRTS)** projects in the National Capital Region to provide comfortable and fast transit to NCR towns and meet the high growth in transport demand. NCRTC is an ideal example of cooperative federalism, wherein the partnership between the Centre and the four NCR states was established through a Memorandum of Understanding (MoU) signed on 29th June, 2011. NCRTC was formally incorporated on 21st August, 2013 as a Company under the Companies Act, 1956.

The ex-officio Chairman of the Board of Directors is the Secretary, Ministry of Housing and Urban Affairs (MoHUA), while all state governments are represented on the board through nominated senior officers.

Vision: Improve quality of life of people by providing equitable, fast, reliable, safe, comfortable, efficient & sustainable mobility solutions enabling economic development of NCR.

National Capital Region Transport Corporation, NCRTC, Background and History

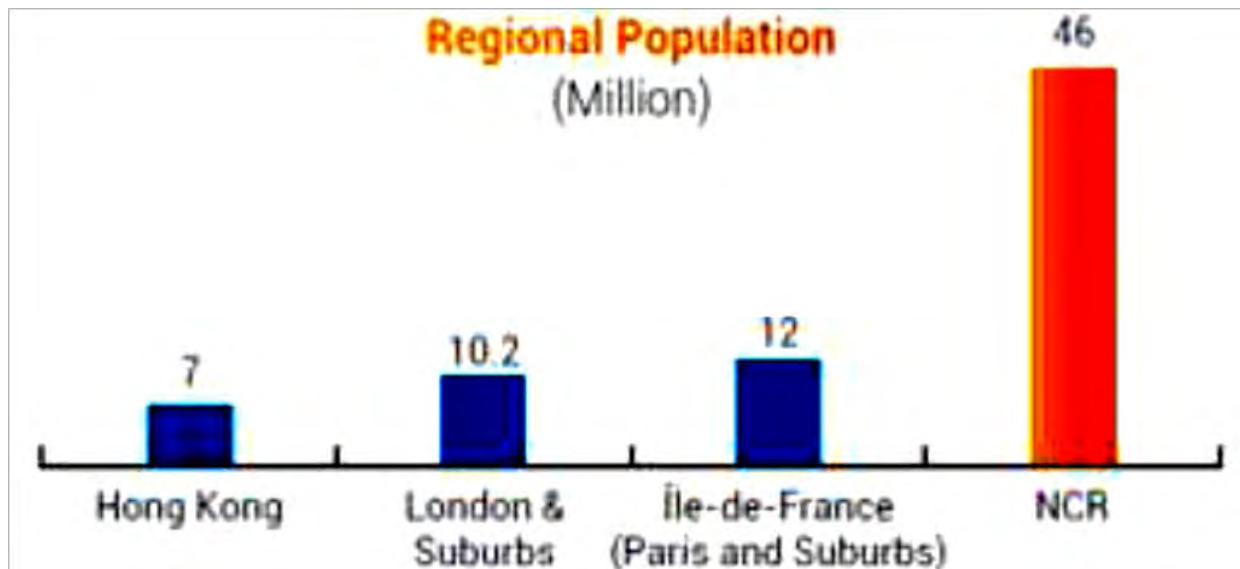


The idea of a high speed integrated commuter railway network to connect NCR was first mooted in 1998-99 in a study commissioned by Indian Railways.

The proposal was re-examined in 2006 in the light of extensions of metro to some of the NCR towns. The National Capital Region Planning Board (NCRPB) subsequently took up the study and recommended 8 RRTS corridors to connect NCR towns in the Functional Plan on Transport for NCR, 2032, leading to signing of MoU and incorporation of NCRTC. Out of 8 identified corridors, 3 are prioritized in Phase- I.

RRTS CORRIDORS IN NCR		
Prioritized Corridors in Phase - I (349 km)		
1	Delhi - Ghaziabad - Meerut	82 km
2	Delhi - Gurugram - SNB - Alwar	164 km
3	Delhi - Panipat	103 km

Corridors in Phase - II (As per functional plan on Transport for NCR - 2032)	
4	Delhi - Faridabad - Ballabhgarh - Palwal
5	Ghaziabad - Khurja
6	Delhi - Bahadurgarh - Rohtak
7	Ghaziabad - Hapur
8	Delhi - Shahadra - Baraut



National Capital Region (NCR):

- Area approx. 58,000 km.
- Fastest growing population in the world – 46 million as per 2011 census 15 million vehicles.
- 73 % commuters use personal vehicles.
- 250 thousand vehicles is of transient nature.
- Accounts for 7% of the total GDP of.

Regional Rapid Transit System (RRTS)

Smart Lines:

RRTS is a rail-based, high-speed transit system aimed at bringing people and places closer in National Capital Region. Once operational, NCRTC Smart Lines will act as the transportation backbone for the region, while ensuring a balanced and sustainable urban development.

System Specifications of Phase I

Parameters	Specifications
No. of Tracks	Two (Ballastless Track)
Track Gauge	Standard Gauge- 1435 mm
Axle Load	17 T
Rolling Stock	Aerodynamic, 3.2 m wide 22 m long, stainless steel/aluminium body
Seating arrangement	Transverse - Aeroplane type
Class of accommodation	Economy Business (one coach per train)
Traction power	1 x 25 KV AC overhead catenary type
Signalling	CATC

RRTS IS DIFFERENT FROM METRO

	Design Speed	Operational Speed	Average Speed	Travel Time for 100 kms
RRTS	180 kmph	160 kmph	100 kmph	1 hour
METRO RAIL	90 kmph	80 kmph	32 kmph	3 hour

System Specifications of Phase I

Parameters	Delhi - Meerut	Delhi-SNB- Alwar	Delhi - Panipat
Total Length (km) approx.	82	164	103
Estimated travel time (min)	55	85	60
No. of total stations	24	22	16

349
kms

600
Coaches

6
Depot

2 Million
daily ridership

Benefits to Users:

- High-speed, High Frequency transit between NCR nodes.
- Safe and comfortable journey.
- High reliability of time.
- Seamless travel - Multi-modal connectivity-Integration with Indian Railways, Inter-state bus terminals (ISBTs), Airports and the Delhi Metro lines at various RRTS Stations.
- Inter-operability of NCRTC Smart Lines among the corridors resulting in seamless high-speed movement in NCR without interchange.
- Significant saving of time.

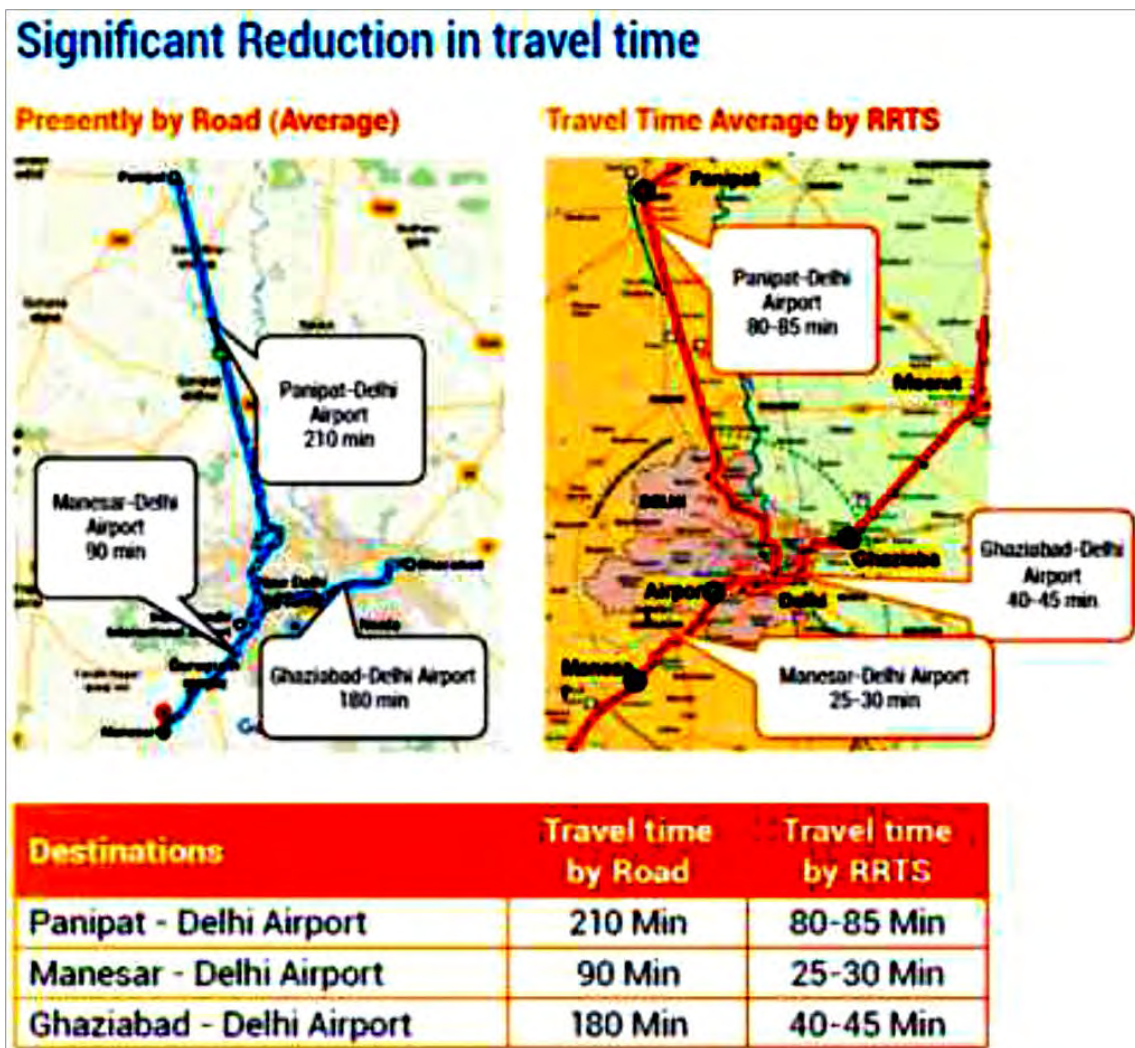
- Improved quality of life.

Benefits to Society:

- Reduced vehicular congestion and pollution.
- Small foot print – High throughput.
- Reduction in Congestion.
- Efficient use of energy and non conventional resources like solar power leading to reduced pollution.
- Enabling Modal Shift

Balanced and Sustainable Growth:

- RRTS will promote polycentric growth and Development.
- Industrial/commercial hubs to be in reach of a larger population.
- Boosting “Make in India” potential in high technology areas



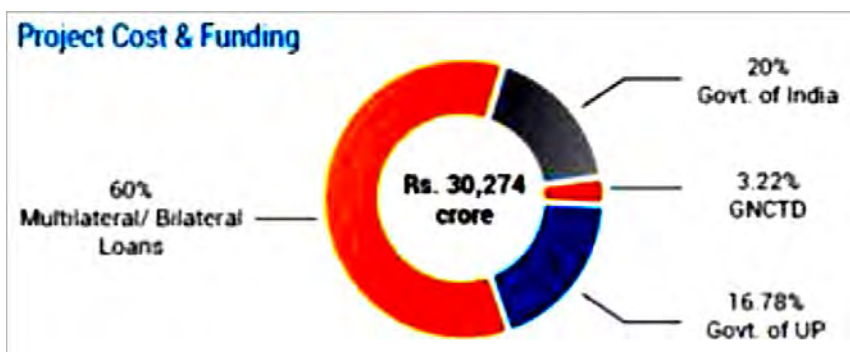
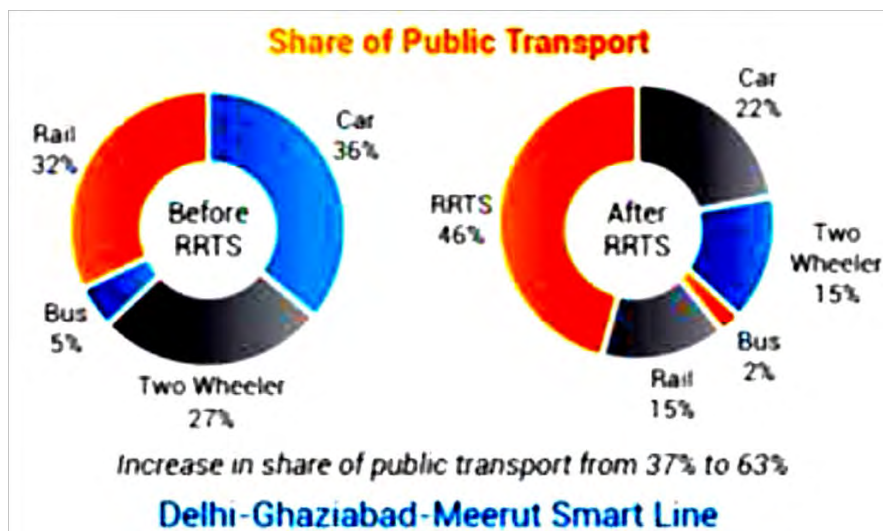
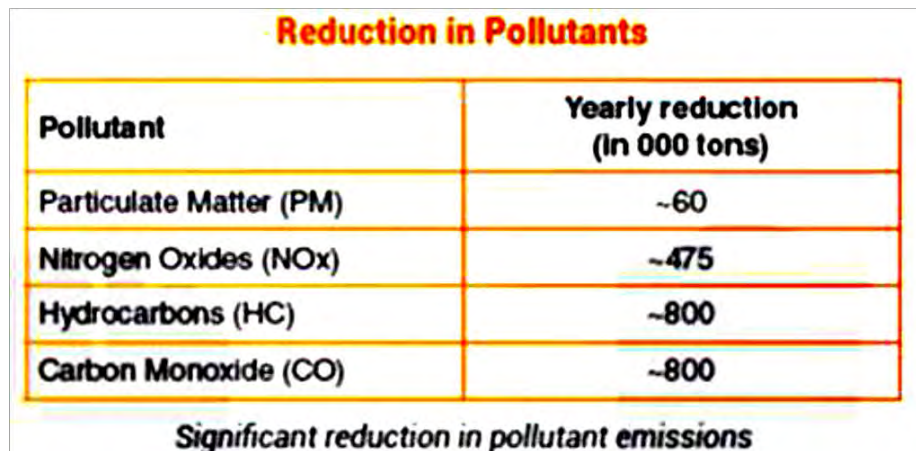
Transportation Backbone for NCR:

- NCRTC Smart Lines across Delhi, Uttar Pradesh, Rajasthan and Haryana will bring NCR closer.
- Reduction in migration of people to Delhi due to increased high-speed connectivity.
- Skill development and employment generation.
- Benefit to working class population, labour force, industrial workers and students among others.

- Access to affordable housing around NCR.
- Creation of new economic/industrial zones.

Transit Oriented Development (TOD):

- Creation of employment opportunities.



Corridor Highlights

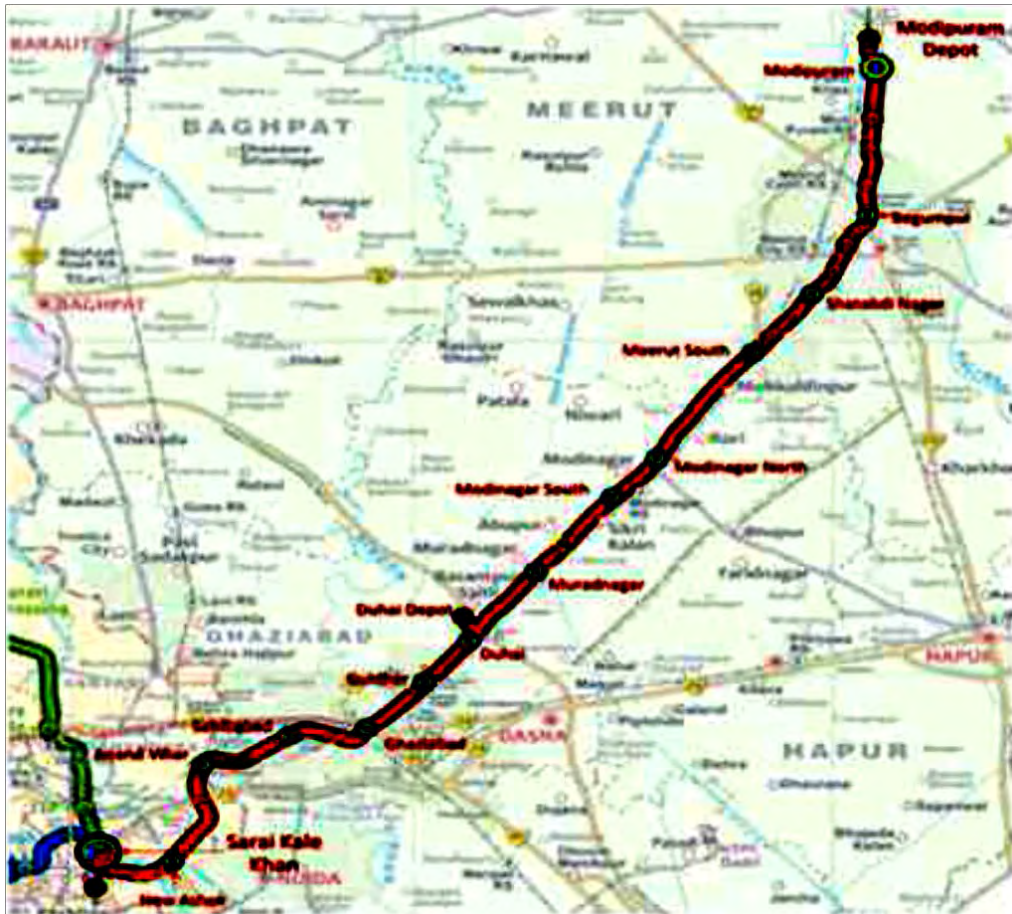
Delhi-Ghaziabad-Meerut Smart Line:

The Delhi-Ghaziabad-Meerut Smart Line will pass through one of the most densely populated sections of the National Capital Region. Starting from Sarai Kale Khan in Delhi, the corridor will go up to Modipuram in north of Meerut city, connecting many urban nodes

such as Anand Vihar, Sahibabad, Ghaziabad, Murad Nagar, Modi Nagar together with high speed.

Hon'ble Prime Minister of India has laid foundation stone of the corridor on March, 2019. As per the DPR, the 82 km long corridor is expected to be operational by March 2025 while the 17 km long priority section between Sahibabad and Duhai is expected to start operation by March 2023. The civil construction work on the section is in full swing. The daily ridership is expected to be more than 8 lakh passengers.

Within Meerut City, NCRTC will run Metro Services (MRTS) on the RRTS infrastructure itself. This will be done by taking some value engineering initiatives and by adding few more stations specifically for Metro operations only.



Delhi-Gurugram-SNB-Alwar Smart Line:

This smart line will pass through the industrialized areas of Haryana and Rajasthan. It is expected to increase the productivity of a commuters travelling to and from Delhi and Gurugram to regions in Manesar, Bawal and Neemrana. This corridor will be constructed in three Phases.

First Phase: A 106 km stretch from Sarai Kale Khan in Delhi to SNB Urban Complex (Shahjahanpur-Neemrana- Behror) i.e, just ahead of Bawal (Haryana), enroute touching various regional nodes like Gurugram, Manesar, Panchgaon, etc. As per the DPR, around 8.5 lakh commuters is expected to benefit daily only from the Phase-I of the corridor.

Second Phase: The line would be extended from SNB to Sotanala, with Shahjahanpur, Neemrana and Behror in between.

Third Phase: The stretch from SNB to Alwar will be constructed. The construction of the corridor is majorly along the edge of National Highway.

The Detailed Project Report of this corridor (Delhi-Gurugram-SNB) has been approved by the State governments and is under active consideration of goI. Pre-construction work such as Geo-Technical Investigation and Pile Load test is in progress.



Delhi-Panipat Smart Line:

Moving towards north-west direction from Delhi, this Smart Line will connect Delhi to towns like Sonapat, Gannaur, Samalakha and Panipat in Haryana. Sarai Kale Khan will be the originating station. The corridor will be Interoperable with other two RRTS Phase-I corridors. The Corridor will go through Kashmere Gate ISBT before moving towards Panipat.

The DPR of the corridor is in advanced stages of finalization. Since the region is populated with large residential and industrial area with number of educational and hospitality institutions, this RRTS corridor has significant potential to act as a catalyst for growth and regional development. Not only will the Smart Line cut down travel time significantly, it will also boost the skill development and employment opportunities in the region.

12th Urban Mobility India, UMI, Conference 2019; India

Metro Rail News, December 2019, p.38



The 12th Urban Mobility India (UMI) Conference was held from 15th to 17th November, 2019 at the Indira Gandhi Pratishthan, Lucknow. The theme of the conference was “Accessible and Livable Cities”. It was attended by more than 1000 delegates, including foreign nationals, students, urban transport experts, practitioners, resource persons, researchers, scholars and senior government officials from 22 States & 4 Union Territories across India and from foreign countries including the Argentina, Brazil, Chile, Germany, Japan, Netherlands, Peru, United Kingdom, United Nations, World Bank, etc. The major topics / sub-themes are as follows:

A. Inaugural Session;

On 15.11.2019, the conference and exhibition was inaugurated by Shri Yogi Adityanath, Hon'ble Chief Minister of State (I/C), Ministry Housing & Urban Affairs, Govt. of India delivered the opening address. Mr. Jose Luis Irigoyen, Former Senior Director, Transport and ICT Global Practices in the World Bank at Washington D.C., U.S.A delivered the Keynote Address. A short video film on “***Journey of Urban Transport in India***” was launched and book on “**Standard Specifications of Light Urban Rail Transit System-METROLITE**” released in this session.

B. Other Major Sessions held are as follows:

1. Conclave on ***“Public Transport for All”***.
2. Panel Discussion on Accessible Mobility.
3. Avenues for Increased Revenue and Cost Cutting Methods in Metro Rail Systems.

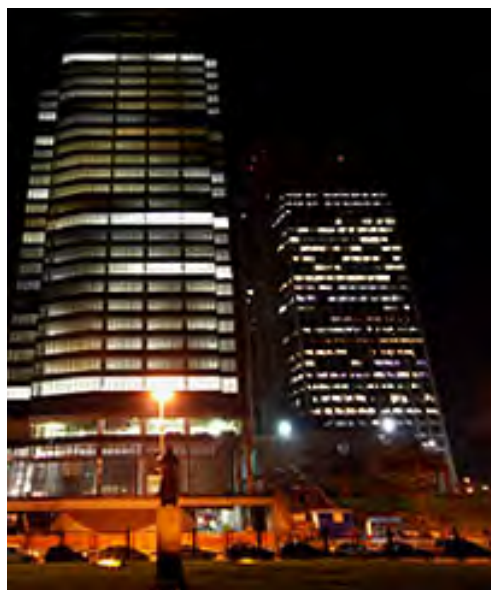
B. Technical Sessions:

1. Walk the Talk on Walkability Policy (panel discussion).
2. Problems for Small and Medium Towns & Introduction of Public Transport Systems.
3. How Women can be empowered through Public Transport?
4. Universal Accessibility.
5. Child Friendly Mobility.
6. Introduction of Electric Mobility: Challenges in Implementation.
7. Clean Air Action Plan: Mitigations in Urban Transport Sector in Reducing Pollution.
8. Technology to Leverage Services for improved Mobility.

Special Economic Zones (SEZs) Policy Regime in India

Ministry of Commerce & Industry, Department of Commerce

Introduction



India was one of the first in Asia to recognize the effectiveness of the Export Processing Zone (EPZ) model in promoting exports, with Asia's first EPZ set up in Kandla in 1965. With a view to overcome the shortcomings experienced on account of the multiplicity of controls and clearances; absence of world-class infrastructure, and an unstable fiscal regime and with a view to attract larger foreign investments in India, the **Special Economic Zones (SEZs) Policy** was announced in April 2000.

This policy intended to make SEZs an engine for economic growth supported by quality infrastructure complemented by an attractive fiscal package, both at the Centre and the State level, with the minimum possible regulations. SEZs in India functioned from

1.11.2000 to 09.02.2006 under the provisions of the Foreign Trade Policy and fiscal incentives were made effective through the provisions of relevant statutes.

To install confidence in investors and signal the Government's commitment to a stable SEZ policy regime and with a view to impart stability to the SEZ regime thereby generating greater economic activity and employment through the establishment of SEZs, a comprehensive draft SEZ Bill prepared after extensive discussions with the stakeholders. A number of meetings were held in various parts of the country both by the Minister for Commerce and Industry as well as senior officials for this purpose. The Special Economic Zones Act, 2005, was passed by Parliament in May, 2005 which received Presidential assent on the 23rd of June, 2005. The draft SEZ Rules were widely discussed and put on the website of the Department of Commerce offering suggestions/comments. Around 800 suggestions were received on the draft rules. After extensive consultations, the SEZ Act, 2005, supported by SEZ Rules, came into effect on 10th February, 2006, providing for drastic simplification of procedures and for single window clearance on matters relating to central as well as state governments. The main objectives of the SEZ Act are:

- Generation of additional economic activity.
- Promotion of exports of goods and services.
- Promotion of investment from domestic and foreign sources.
- Creation of employment opportunities.
- Development of infrastructure facilities.

It is expected that this will trigger a large flow of foreign and domestic investment in SEZs, in infrastructure and productive capacity, leading to generation of additional economic activity and creation of employment opportunities.

The SEZ Act 2005 envisages key role for the State Governments in Export Promotion and creation of related infrastructure. A Single Window SEZ approval mechanism has been provided through a 19 member inter-ministerial SEZ Board of Approval (BoA). The applications duly recommended by the respective State Governments/UT Administration are considered by this BoA periodically. All decisions of the Board of approvals are with consensus.

The SEZ Rules provide for different minimum land requirement for different class of SEZs. Every SEZ is divided into a processing area where alone the SEZ units would come up and the non-processing area where the supporting infrastructure is to be created.

The SEZ Rules provide for:

- "Simplified procedures for development, operation, and maintenance of the Special Economic Zones and for setting up units and conducting business in SEZs.
- Single window clearance for setting up of an SEZ.
- Single window clearance for setting up a unit in a Special Economic Zone.
- Single Window clearance on matters relating to Central as well as State Governments.
- Simplified compliance procedures and documentation with an emphasis on self certification.

Approval Mechanism and Administrative set up of SEZs Approval Mechanism

The developer submits the proposal for establishment of SEZ to the concerned State Government. The State Government has to forward the proposal with its recommendation

within 45 days from the date of receipt of such proposal to the Board of Approval. The applicant also has the option to submit the proposal directly to the Board of Approval.

The Board of Approval has been constituted by the Central Government in exercise of the powers conferred under the SEZ Act. All the decisions are taken in the Board of Approval by consensus. The Board of Approval has 19 Members.

Administrative Set Up

The functioning of the SEZs is governed by a three tier administrative set up. The Board of Approval is the apex body and is headed by the Secretary, Department of Commerce. The Approval Committee at the Zone level deals with approval of units in the SEZs and other related issues. Each Zone is headed by a Development Commissioner, who is ex-officio chairperson of the Approval Committee.

Once an SEZ has been approved by the Board of Approval and Central Government has notified the area of the SEZ, units are allowed to be set up in the SEZ. All the proposals for setting up of units in the SEZ are approved at the Zone level by the Approval Committee consisting of Development Commissioner, Customs Authorities and representatives of State Government. All post approval clearances including grant of importer-exporter code number, change in the name of the company or implementing agency and broad banding diversification, etc. are given at the Zone level by the Development Commissioner. The performance of the SEZ units is periodically monitored by the Approval Committee and units are liable for penal action under the provision of Foreign Trade (Development and Regulation) Act, in case of violation of the conditions of the approval.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE



Los Angeles Light Rail Transit, LRT, Blue Line

Urban Transport News in Brief; Global

11th December 2019; Metro Report International



Photo: Ivan Rukovitsyn

PK TS has started series production of trolleybuses at the former **Trolza** factory in Engels.

A 1.4 km eastern extension of **Zhengzhou** metro Line 1 opened on November 21 from Wen Yuanbeilu to Henan University New Campus.

A consortium of Siemens Mobility, ST Engineering and BES Engineering Corp is to supply signalling for two stations on the **Taoyuan** International Airport Line, serving airport Terminal 3.

A 17.7 km BRT route operated by an Autonomous Rail Rapid Transit vehicle has been inaugurated in **Yibin**. Services are operated using a CRRC Zhuzhou autonomous bus.

A 1 km extension of tram Line 5 in **Kazan** opened on November 18 from Solnechni Gorod to Midkhat Bulatov Street.

Wien tram Line D was extended by 1.1 km from Alfred-Adler-Straße to Absberggasse on December 2.

Alstom is modernising Series 100 metro trains in use on Line E in **Buenos Aires**.

Massachusetts Bay Transportation Authority has awarded Keolis a \$ 30m contract to design the second phase of the Franklin Line double tracking project.

Beijing Metro tops 699 km making it World's largest Network; China

Dec 30, 2019; written by [David Briginshaw](#) IRJ Pro

THE start of trial operation on two extensions to the Beijing Metro on December 28 has extended the network to 699.3 km with 405 stations, making it the world's largest metro network and pushing Shanghai metro into second place.



The two new metro sections comprise a 16.6km eastern extension of Line 7 and a 4.5km southern extension of the Batong Line to Huashuang and a common terminal at Universal Studios. The Universal Studios theme park is still under construction and is due to open in 2021.

This was followed on December 30 with the opening of Qinghe station on Line 13. This is an interchange with the new [Beijing – Zhangjiakou high-speed line](#) which opened on the same day.

By the end of October 2019, Alstom is due to finish its first Train for Hanoi Metro Line 3

Railway News, 29th Oct. 2019



Alstom on track to complete first Train for Hanoi Metro Line 3

In 2017, Hanoi Metropolitan Railway Management Board (MRB) and Alstom signed their first integrated metro system contract. As part of this contract, Alstom is manufacturing 10 trains for the Hanoi Metro Line 3. It says it will finish the first trainset by the end of October 2019.

In 2017, Alstom, as leader of a consortium including Colas Rail and Thales, was awarded the contract to supply an integrated metro system for Hanoi Metro Line 3.

A Visit from Tran Quoc Vuong and Delegates

On 26th October 2019, Alstom hosted a visit from Tran Quoc Vuong, the Deputy General Secretary of the Communist Party of Vietnam. Along with his party, they visited Alstom's Valenciennes train assembly plant in France. During this visit, Olivier Loison and Nguyen Duc Chung signed a memorandum of understanding. Loison is the Managing Director for Alstom in China and East Asia. Chung is the Mayor of Hanoi and Chairman of the Hanoi People's Committee. This agreement builds on the [original contract between Alstom and Hanoi from 2017](#). It encourages future co-operation between the two parties, particularly with regard to developing updated systems in the Vietnamese capital.

Full Construction of first Underground Metro Line in Manila launched; Philippine

Dec. 27, 2019; written by [David Burroughs](#); International Railway Journal

FULL construction on the first underground metro line in Manila, the Philippines, began on December 21., after breaking ground in February 2019.



[The first section](#) comprises the first stations in Valenzuela City and Quezon City, the line's depot in Valenzuela City, and buildings for the Philippine Railway Institute (PRI), the country's first railway training centre.

A ceremony to mark the start of the metro construction was held at the depot site in Barangay Ugong, where the East Valenzuela Station will be located.

The line, which is targeting partial opening by 2021, is expected to serve 370,000 daily passengers in its first year of full operations. The line will have 15 stations, including a terminal station at Terminal 3 of Ninoy Aquino International Airport (NAIA).

The Philippines Department of Transport has already issued offers for 364 of the 460 lots of land required for the line, with 285 of these accepted.

The 36 km first phase of the north-south line will run from Quirino Highway in Quezon City to Taguig and Ninoy Aquino International Airport Terminal 3, serving three of Manila's business districts.

The project is being funded by an official development assistance loan from Japan. The Metro Manila Subway will use Japanese technology and feature technological advancements and disaster-resilient strategies aimed to ensure the line's structural integrity amid regular occurrence of typhoons and earthquakes.

The Manila Underground Metro project is being funded by official development assistance (ODA) loan from Japan.

Australia commences Sydney Light Rail Transit Service back after 60 Years; Australia

By Krishtina D'Silva; 14/12/2019; Urban Transport News



New Sydney LRT changes at Station from Overhead Catenary to Ground-based electric Power Feeding

Sydney, Australia (Urban Transport News): Transport for New South Wales ([TfNSW](#)) commenced Sydney Light Rail in passenger service at 11 am from Circular Quay to Randwick – dubbed L2 – marks a shift towards greater use of public transport in the city.

French firm [Alstom](#), as part of the ALTRAC Light Rail consortium, has been responsible for the integrated light rail system, that included the design, delivery and commissioning of 60 Citadis X05 Light Rail Vehicles (LRV), power supply equipment including **APS – the wire-free ground-based power supply** (over two kilometres), the energy recovery substations – HESOP, signalling, communications, depot equipment and 19 years of maintenance.

The new 12 km network has been delivered under a turnkey PPP model that will provide the commuters of Sydney with frequent, reliable, high capacity services running from Circular Quay in the city's CBD to Central Station, then south-east to Randwick. Each LRV has a capacity of 450 passengers – the equivalent of nine standard buses and will move up to 13,500 commuters per hour (6,750 in each direction) during peak times once fully operational. Normal tram services will operate seven days a week between 5 am and 1 am. Mark Coxon, Managing Director for Alstom in Australia & New Zealand said:

Alstom is extremely proud to be a part of this iconic project. This new Light Rail system will transform Sydney and provide a step-change in the city's public transport capability and reliability while protecting the aesthetic appeal of the CBD and improving the sustainability of the overall transport network.

As part of the contract, the consortium has also taken over the operations and maintenance of the existing Inner West Light rail (IWLR) that connects Sydney's inner west with the Pyrmont peninsula, Darling Harbour and the southern CBD. Alstom is also responsible for the maintenance of the existing system which includes 12 CAF Light Rail Vehicles.

Partly Catenary-free City Tram Route opens in Sydney: Australia

16th December 2019; Metro Report International



AUSTRALIA: The first phase of the CBD & South East light rail route in Sydney was inaugurated on December 14, with a weekend of free travel.

The 7.3 km north-south Randwick Line, also known as L2, serves 14 stops between Circular Quay and Randwick. A second southern branch from Moore Park to Kingsford is still to open. This would add five stops and 4.7 km.

The route is being built under a A\$2.1bn PPP contract awarded to the ALTRAC Light Rail consortium of Alstom, Transdev Sydney, Acciona Infrastructure Australia and Capella Capital, in addition to three equity investors: John Laing, First State Super and Acciona Concesiones.

Alstom has supplied a fleet of 60 Citadis X05 five-section Light Rail Vehicles (LRV), which are intended to operate in 67 m long coupled pairs. The manufacturer is also supplying signalling, power supply equipment, its HESOP energy recovery system and equipment for the Randwick Stabling Yard.

The 2 km section from Circular Quay to Town Hall is equipped with Alstom's APS ground-level power supply to enable catenary-free operation. APS uses an embedded third rail to supply power to trams, with the conductive segments live only while a tram is passing over them.

The PPP contract also includes 19 years of operations and maintenance. The consortium has also taken over the operations and maintenance of the existing Inner West Light Rail route, including that route's fleet of 12 CAF LRVs.

Catenary-free Battery Tram Extension inaugurated in Birmingham; UK

11th December 2019; Metro Report International



UK: The first phase of the Westside tram extension in Birmingham opened to passengers on December 11th 2019.

The extension runs from Grand Central, which serves New Street railway station, to Library stop in Centenary Square, with an intermediate stop at Town Hall in Victoria Square.

The extension features no overhead wires, making it the first modern commercial tramway in the UK with catenary-free running. West Midlands Metro's fleet of 21 **CAF Urbos trams** has been retrofitted with traction batteries supplied by Saft to enable off-wire operation.

Work on the extension began in June 2017. The second phase, due to open in 2021, will add three stops and take the route to Edgbaston.

Foshan welcomes Hydrogen Fuel-Cell Tram; China

2. December 2019; Metro Report International



CHINA: A hydrogen fuel cell tram has started test running on the Gaoming Line in Foshan, ahead of opening of the city's first tram route later this month.

The 17.4 km Gaoming Line on the west bank of the Xijiang River is intended to serve 20 stops when completed. The first phase will serve 10 stops on a 6.5 km section of the route.

CRRC Qingdao Sifang is supplying eight trams powered by hydrogen fuel cells developed with Canadian company Ballard Power Systems under a C\$ 6m agreement. The three-section low-floor trams have capacity for 285 passengers and a maximum speed of 70 kmph. Six hydrogen storage cylinders give the vehicles a range of 100 km.

Foshan is investing heavily in the technology, having reportedly already put 768 hydrogen powered vehicles into service by the end of October. It has a network of six refuelling stations, with another 12 expected to come on line by the end of this year.

Fuel cell trams are already in service in Qingdao and Tangshan.

Solaris to supply 100 CNG Buses to Tallinn; Estonia

12th December 2019; Metro Report International



ESTONIA: Tallinn transport operator Tallinna Linnatranspordi has ordered a total of 100 CNG buses from Solaris Bus & Coach. The contract announced on December 10 is worth €27m.

Solaris will supply 60 Urbino 12 buses and 40 Urbino 18 articulated buses between September and November 2020. The 12 m long version will have capacity for 80 passengers including 31 seated, while the 18 m vehicles will have capacity for 150 passengers including 41 seated.

The low-floor buses will all be fitted with a 239 kW engine and five roof-mounted gas storage cylinders with a capacity of 315 litres each. As well as a cold start function, that enables the engine to start at low temperatures, the vehicles will be equipped with air-conditioning, USB sockets, a passenger information system, and five internal and two external CCTV cameras.

CRRC beats Skoda and Siemens for Porto LRV Order; Portugal

Dec. 17th, 2019 written by [David Burroughs](#), IRJ Pro

PORTO Metro's Board of directors has approved a €49.6m contract with CRRC Tangshan for the supply of 18 LRVs. The four-section vehicles will have capacity for 252 passengers, including 64 seated, with a maximum speed of 80 kmp.



Bombardier Eurotram LRV at Porto

The investment, which is being fully funded by Portugal's Ministry of Environment and Climate Action's environment fund, will expand Porto Metro's fleet to 120 vehicles, including the existing fleet of 72 Bombardier Eurotrams and 30 Bombardier tram-trains.

CRRC beat Siemens and Skoda for the tender, which was launched on December 21 2018 with a budget of € 56.1m. The bids were evaluated on price, technical value and design criteria. The new LRVs will be shipped to Portugal between 2021 and 2023 at the rate of one per month.



The new fleet will support the construction of the new Rosa Line between São Bento and Casa da Música, along with an extension of the Yellow Line south from Santo Ovídio and Vila d'Este, in Vila Nova de Gaia. Work on the new lines is expected to begin soon, with completion scheduled in 2023, adding 6km and seven new stations at a cost of around €300m.

Porto Metro currently operates six lines covering 67 km with 82 stations in seven municipalities. The network was used by more than 62 million passengers in 2018, with a growth rate of around 13% so far in 2019.



Join us for the 5th annual Light Rail conference

METRO NEWSLETTERS **on Technologies for** **“URBAN MOBILITY AS A SERVICE”**

PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, COMMUTER-RAIL, MONORAIL, AERIAL ROPEWAY, BOTTOM CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD CARS, SUSPENDED METRINOS

TRANSPORT TECHNOLOGIES AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIROMENT



Artists's Impression of suspended and Rope pulled Automated People Mover or Pod-Taxi Monorail for Varanasi

METRO Newsletter by Dr. F.A. Wingler

PREFIX:

Solutions and applications with and of Digitalisation, Internet of Things, Artificial Intelligence, Big Data, Building Information Modelling, Digital Twin, Enterprise Resource planning in Transport Technologies for Urban Mobility have already arrived in India from “**other countries**”.

Light Rail Transits have become worldwide popular and are on the rise. Metro Rail across India run into losses. This has sparked of initiatives and activities for Light Rail Transits in India. The Chief Editor of Metro Rail News, Mr. Narendra Shah writes:

A Light Rail based Transit, LRT, makes more sense for Indian cities, particularly the non-metro ones. Delhi's much-lauded metro rail system sparked a frenzied rush in other cities to build similar metros. Hopefully, with the national capital getting ready to build a light-rail based transit system. The Union Ministry of Housing and Urban Affairs approved two such corridor of Delhi Metro Rail Corporation and Recently other cities will now start paying more attention to the hitherto ignored light rail transit options. The light rail trains in both Delhi and Nashik are expected to run on rubber tyres at street level. These are welcome developments to provide rapid and affordable transit options to masses.

The current publications reveal very clear that India has become open to adopt from “**other countries**” transport technologies other than **METRO RAIL** under the guidance of Commerce and Industry Minister Piyush Goyal.

Eco friendly Propulsion Technologies with electric, battery storage, super capacitor storage, hydrogen fuel cells, bio-fuelling, liquid gas fuelling, hybrid technologies with Diesel-electric, overhead catenary feeding, ground level power supply and intelligent electric charging technologies are also coming to India, enlarging the spectrum of **METRO RAIL**.

Urban Transport in India will be in future much more than only with METRO RAIL. In answer to the chaotic transport situations in Indian Cities, cheaper mobility modes than with Metro Rail have to be offered for the majority of population with less income, that cannot afford the Metro Rail Fares!!

METRO RAIL spurs the mobility of those, who can afford the fares, however, it brings less alleviation for India's low income population. To reach with METRO RAIL a dense city coverage will become highly cost effective. India has to look for cheaper transit decisions providing Urban Mobility also for the mass of lower income population in order to solve its chaotic traffic conditions. This had been already recognized in India by experts.!!

The Topics of newsletter METRO 96 are:

I. Activities and Initiatives in India

- Maha Metro Technological Advancement to handle Infrastructure Projects using 5D Building Information Modelling, BIM, and Enterprise Resource Planning, ERP. Maha Metro, Nagpur is the first Project in the Country to implement the 5D BIM Project Visualization.
- Exclusive Interview with Rajesh Agrawal, Member (Rolling Stock), Railway Board on Digitalisation, Internet of Things and Automation.
- AI and Machine Learning will contribute USD 1 Trillion to Indian Economy by 2035; Government committed to ensuring stable Environment for Investors and Start-ups - Piyush Goyal.
- Rise of Light Rail Projects worldwide; why Indian Government plans to adopt LRT, Initiatives in India.
- Kochi to get METROLITE soon. Trams were the preferred Mode of Transport from 1890s to 1940s till they were withdrawn in Favour of Buses and Cars, which ended up polluting the Atmosphere and causing frequent Accidents.
- Nitin Gadkari dubs India as 'Goldmine' for Ropeways asking Doppelmayr to tap Opportunities.
- RITES to submit Light Metro and Ropeway Draft Project Report, DPR, for Varanasi.
- DMRC submits DPR for two proposed Metrolite Corridors. A Metrolite Train, which will have three-Coach Sets and will comfortably accommodate 300 Passengers at a Time, will be sufficient to handle the Passenger Traffic on this Route.
- AP CM Jaganmohan Reddy to implement Tram on Tyres in Visaghapatnam. Earlier, the A. P. Government had earlier decided to complete the Vizag Metro Project, covering 140 km, in three Phases. The first Phase, covering 46.42 km, is expected to be taken up in three Corridors.
- Decks cleared for revise Metro Rail Project in Visakhapatnam.
- DPR to be prepared for Tram-like public Transport System in Visakhapatnam.
- Panel prepared to outline Standard, Specification for "METRO ON TYRES" Hardeep Singh Puri. Panel prepared to outline Standard and Specification for "Metro on Tyres".
- Hyderabad Metro gets Safety Clearance for JBS-MGBS Route. The Safety Certificate issued by CMRS has cleared the Way for the Introduction of Passenger Services on the last Corridor of Hyderabad Metro Rail Project Phase-1.
- Mumbai Metro Rail Corporation, MMRC, plans to get 15% Revenue from non-Fare Options to post Underground Corridor. MMRC wants to connect residential or commercial Complexes within a 500 m Radius of Metro Stations via Underground Subways.
- Mumbai Metropolitan Region Development Authority, MMRDA, to build avant-grade Double-Decker Metro Depot.
- Second Tunnel Boring Machine, TBM S79, commissions in Pune Metro by Gülermak-TPL JV. Shinde has inaugurated Tunnel Work and Tunnel Boring Machine (TBM) by pressing the switch of TBM S79 Mula (names after River Mula) and the Cutter Head of the Machine started rotating.

II. Global Activities and Initiatives

- Smart Transit, Boston March 17-19, 2020 on Revolutionizing Transit by Digitalisation and Innovation.

- Rise of Light Rail Projects worldwide; why Indian Government plans to adopt LRT, Global and Indian Initiatives; Global, India. Globally, Light Rail Transits are on the rise and quite popular.
- IT-TRANS 2020: Exhibitors present digital Solutions for Urban Mobility.
- Bogotá LRT Regio-Tram de Occidente Contract awarded.
- Bogotá LRT Regio-Tram de Occidente Contract awarded.
- Supercapacitor Hybrid Buses from Solaris to reduce Emissions at Stops.
- EBRD Urban Transport Programme finances Poltava Trolleybus Order; Ukraine.
- Abidjan to expand Bus Network and study Cocoa Biofuel; CÔTE D'IVOIRE.
- **Abidjan Metro Package approved; CÔTE D'IVOIRE.**
- **CNG Buses delivered to Abidjan; CÔTE D'IVOIRE.**
- First Phase of Sydney Light Rail Transit with Alstom APS Ground-Level Power Supply inaugurated.

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Maha Metro Technological Advancement to handle Infrastructure Projects using 5D Building Information Modelling, BIM, and Enterprise Resource Planning, ERP; India

[January 6, 2020 Rail News](#)

Maha Metro, Nagpur is the first Project in the Country to implement the 5D BIM Project Visualization.



Current Era of technological advancement has bestowed multiple ways to making a project a success using **Digital Platform**. Digital platform has enabled [Maha Metro](#) to curtail down in terms of cost and fast execution of [Nagpur Metro](#) project, which will be beneficial for public [transport](#) in coming days.

After successfully implementing 5 D [Building Information Modeling \(BIM\)](#) for its project, Maha Metro is now exploring 6D **BIM** or 6D **Building Information Modeling** mechanism for its project. 6 D BIM – a term widely used in the [infrastructure](#) industry, refers to the intelligent linking of individual 3D components or assemblies with all aspects of project life-cycle management information.

Use of 6D BIM is expected to save a whopping Rs. 1,450 crores for Maha Metro over period of 25 years.

A typical lifecycle of metro project is for 50 years which includes 4 to 5 years on design and construction, and 40 to 45 years on operations and maintenance. When considering the whole life of metro, 80% of the total costs are involved in operations phase. Considering this point, Maha Metro has started working during construction phase itself to capture all assets on digital platform to reap benefits during Operation and Maintenance (O&M) phase.

Maha Metro, Nagpur is the first project in the country to implement the 5D BIM Project visualization. It is also the first to extend the resources to achieve another milestone of 6D BIM. With 6D BIM Maha Metro, Nagpur has created a digital twin with an asset management system. This way the organization has reduced the information loss which happens at the project handover time.

Traditionally the complete handover takes place between the project team and O&M team within a short span, but with this excellent approach, Maha Metro has done a seamless handover on the digital platform. Final deliverables are 3D As-Built models rather than the drawings, based on which the O&M team was able to plan the maintenance strategy and philosophy in advance.

To maintain the asset information in Maha-Metro, Maha-Metro has developed Asset Tag, where 3D component information has been linked such as product details, operation and maintenance manuals, Product specifications etc. The same Asset tag is being used for identifying the assets and to perform maintenance activities.

Total no. of assets estimated will be around 500,000 covering Rolling stock, MEP, Signaling, Telecom, OHE, Power supply, Viaduct, Stations etc. As per Detail Project Report (DPR) of Maha Metro Nagpur, overall O&M Expenses for 25-year period is around Rs. 14,491 crores. We expect to save around at least Rs. 1,450 crores over 25 years considering all the above expected outcomes.

The transformative power of building information modeling is that 10% to 17% savings are expected by implementing BIM in operations phase. Many infrastructure projects across the globe are using BIM, but some of them are utilizing the full benefits of BIM. **However, BIM has major benefits in operation phase.** We are fortunate to be one of the projects, where **BIM is utilized for whole project's life cycle.**

Exclusive Interview with Rajesh Agrawal, Member (Rolling Stock), Railway Board on Digitalisation, Internet of Things and Automation; India

Metro Rail News, January 2020



Metro Rail News Team conducted an e-mail interview with Mr. Rajesh Agrawal, Member (Rolling Stock), Railway Board and ex-officio Secretary to the Government of India. He talks about Railway automation and digitalization impact, execution and future plans. Here are the edited excerpts:-

Why does the Indian Railway need to implement Automation and Digitalization?

Mr. Rajesh Agrawal: In 2019; it has been my proud privilege to head the Rolling Stock department of the Great Indian Railways that is amongst the largest Railways and a socio-

economic lifeline of our vast country. In keeping with the inspiration of our Hon'ble PM to Perform, Reform and Transform; we successfully made this a game changer year in Indian Railways for Technological Transformation of Trains. For this purpose; an extraordinary initiative was taken for Automation and Digitalization that has led to Visible and discernible impact of our Transformation initiatives in Indian Railways for India and beyond.

From where you get the Idea of Automation and Digitalization?

Mr. Agrawal: My Science, Mathematics and Triple Engineering graduation background, Passion for Technology from childhood, proficiency in Computers since Microsoft DOS 1.0 in mid-Eighties and vast experience of almost 4 decades has always enabled me with Technology solutions for Industrial Automation in a connected world to deliver exponential progress. As Apex in-charge in 2019 for Rolling Stock, I got a valuable opportunity to use my knowledge, skills and aptitude in Automation and Digitalization for the effective Transformation of Rolling Stock in Indian Railways like never before.

How the Automation and Digitalization will affect Indian Railways? What are the current Steps you have already taken to implement Automation and Digitalization?

Mr. Agrawal: The railway is all about Trains a.k.a Rolling Stock. In 2018; The synergy, initiatives and efforts of our Rolling Stock team of almost 2000 officers and over 300,000 staff has been unprecedented with wholehearted efforts to Digitalization and Automation for transformation in 2019 all the five major areas as follows:-

1) SMART Coaches, IoTs, Sensors, SCADA, networking, analytics, diagnostics, alerts etc have been conceptualized and rolled out for significantly improved inspirational Passenger Experience with Awe, Ambience & Amenities.

2) Train-sets with TCMS (Train Control and Management System) for Reshaping of countrywide mobility to Hub and Spoke high-speed movement through World class state of the art Trains:

- Intercity 130-160 kmph (Vande Bharat) to identified hubs at average speeds of 90-110 kmph rather than existing 45-55 kmph.
- Regional 100-160 kmph (MEMU) for movement within a region up to 500 kms again at around double of the current average speeds.
- Suburban 80-120 kmph (EMU) with speeds increased up to 120 kmph and in more metro cities in India
- Metro, that Railways too can make more economically and sustainably.

3. Reducing the high Logistics cost as per National Logistics Policy for Safe, Secure and Swift movement of Goods in India:

- Digital 3-D parametric Design/Simulation/Development for the concept to Roll out within the same year rather than several years.
- SMART Yards with Tracksides sensors/diagnostics, RFID, etc at around 40 locations covering most of the movement with predictive maintenance > higher axle-load of 25 t has been made possible for the first time.
- higher speed up to 100 kmph with 25 t axle-load has been made possible for the first time

- higher load ability for bulk and non-bulk commodities has been made possible for the first time to significantly improve rail share of freight especially in automobiles, 2-wheelers, trucks, containers, steel-coils, fly ash, etc.

4. Industry 4.0 Robotic and Cyber-Physical enabled Manufacture in terms of the National Policy for Advanced Manufacturing and improving Share of manufacturing in India's GDP for World-class Quality and Exponential growth in Quantities:

- Exponential jump in Manufacturing in all units becoming largest coach producers in the world.
- Upscaling manufacture to State-of-Art and fit for large scale exports-> Eliminating shortage of coaches for the first time in India

5) Environment Impact as per National / International commitments:

- Bio-toilets as the most significant Swachh Bharat initiative impacting all Trains, all Stations and the country at large
- Meeting our Railway NDC commitments perhaps by 2022 instead of 2030.

How Automation and Digitalization will affect Employment in Indian Railways?

Mr. Agrawal: As above; the Scale has been enabled to grow exponentially for Existing Passenger services, Train-sets, Freight and Manufacturing that is resulting in large scale creation of jobs in IT, Goods and Services.

How digital Services for Rolling Stock will help to reduce the overall Cost of Maintenance?

Mr. Agrawal: This has already happened as the huge increase in Coaches, wagons and manufacturing are being done only with existing man-power, yard-sticks for maintenance have been reduced and the predictive maintenance regime that has been ushered in will reduce the cost of maintenance.

What is the estimated Cost to automate and integrate the Train Control System?

Mr. Agrawal: This is a part of ongoing revenue and capital expenditure that results in an increase in productivity, reducing time & cost of maintenance, better utilisation and availability of assets, timely need-based predictive maintenance rather than costly preventive-maintenance/breakdown and increase in revenues & decrease in expenditure as a consequence.

How will Automation and Digitalization be useful for Passengers? How much Time it will take to complete Automation and Digitalization Railways?

Mr. Agrawal: As mentioned above in the steps already taken; passenger train manufacture, amenities, experience and services are improved with a motto to Perform, Reform and Transform with Skill, Scale & Speed. This is an ongoing exercise that has already been cut-in with all-new manufacture of coaches, retro-fitment in existing coaches and maintenance-depots and improvements as technology improves with time.

Our booklet and conference are being held tomorrow with Industry leaders and partners to showcase the game-change of 2019 in Indian Railways for Technological Transformation of Trains and the way forward.

AI and Machine Learning will contribute USD 1 Trillion to Indian Economy by 2035; Government committed to ensuring stable Environment for Investors and Start-ups - Piyush Goyal; India

Commerce and Industry Minister inaugurates NSE knowledge Hub in New Delhi.

Posted on: 06th JAN 2020 1:59PM by PIB Delhi

Commerce and Industry & Railways Minister Piyush Goyal today inaugurated the National Stock Exchange (NSE) Knowledge Hub in New Delhi, an Artificial Intelligence (AI) powered learning ecosystem that will assist the banking, financial services and insurance (BFSI) sector. Speaking on this occasion Commerce & Industry Minister said that although India has developed as the second largest fintech hub in the world, a lot of work still needs to be done in the BFSI sector. He hoped that the Knowledge Hub created by NSE will fill in these gaps and help the financial sector to move into the future.

The NSE Knowledge Hub will enhance skills and help academic institutions in preparing future-ready talent for the financial service industry. It is also available on mobile and attempts to bring together world class content and learners through this state-of-the-art and future-ready platform.

Commerce and Industry Minister said that this industry driven learning eco system will help India in building next generation skills and capabilities in the BFSI sector. The use of AI will ensure that the skill up-gradation is affordable and accessible and helps in the creation of a workforce that is adequate for the requirements of the sector said Piyush Goyal. AI and Machine Learning will contribute USD 1 trillion by 2035 and this is a good beginning by NSE to tap the potential of AI and use it as a tool to create a workforce in the BFSI sector in India added the Minister.

Commerce and Industry Minister assured continued Government support to investors and startups and said that India is a safe investment destination today for investors, even the smallest of investors and this Knowledge Hub by NSE will strengthen and empower those working in the BFSI sector and will benefit investors and the financial services to give world class services through knowledge, innovation and value-addition.

Rise of Light Rail Project worldwide; why Indian Government plans to adopt LRT, Initiatives in India; Global, India

December 9, 2019 Articles; Rail Analysis India

Globally, Light Rail Transits are on the rise and quite popular



Artist's Concept of "NEXT GENERATION TRAM/LRV" by Stadler



Introduction:

Nowadays with the rising concern over the viability of the cost of metro rail projects, especially in smaller cities, the Central government of India is planning to promote Light Rail Transit System as an alternative mass rapid transport system in urban areas.

Light rail transit (LRT) is a form of urban rail transit using rolling stock similar to a tramway, but operating at a higher capacity, and often on an exclusive right-of-way. Light rail transit (LRT) is a medium capacity mode of mass rapid transport which straddles between the heavy capacity Metro rail and the low capacity bus services.



Metro / LRT / BUS Comparison:

LRT is a form of rail transit that utilizes equipment and infrastructure that is typically less massive than that used for heavy rail modes i.e. commuter/regional, and metro rail/subway. A few modes such as people movers and personal rapid transit could be considered as even “lighter”. LRT may be at grade, partially grade-separated or completely elevated.

Light rail vehicles generally have a top speed of around 100km/h though mostly operating at much lower speeds, kind of like the road vehicles.

Why Indian Government plans to adopt LRT:

To boost the public transportation system in cities, the Indian Central Government is planning to bring a new mass transport system called Light Rail Transit. This system, also to be known as, Metrolite could become a dedicated rapid rail corridor in cities and towns with tracks on the surface instead of elevated or underground stretches as is the case with metro rail corridors across the country. The centre's Housing & Urban affairs ministry had prepared the plan and finalized the standards and specifications for Metrolite and has sent them for review to the Railways .

The BJP in its poll manifesto of 2019 has promised to introduce metro rail system in 50 cities of the country. The conventional metro rail system, which requires huge capital investment, may not be viable in many smaller cities coming under the tier-II and tier-III category. According to the current population, there would not be enough ridership as well. In these cases the centre can think for Light Rail System – Metrolite, which will be suitable at much less cost and will also act as feeder services from various parts of the city. As per

the present status , approx 657kms of metro rail network is operational across the country and another 800kms is under construction in 27 cities.

Initiatives in India :

Delhi Tender of the LRT: The government is planning to introduce the Light rail transit system for the remaining 3 corridors of the phase 4 project of the Delhi Metro This will also reduce the cost by 25 to 45 per cent compared to the existing metro systems . A high level meeting was held to discuss the adoption of light rail transit system standards for the remaining 3 corridors that are Inderlok to Indraprastha, Lajpat Nagar to Saket G block, Rithala – Bawana – Narela.

The Union Housing and Urban Affairs Ministry and the Board of the Delhi Metro have approved the Light rail transit system on a 20km stretch from Dwarka sector 25 to Kirtinagar. Besides the cost saving, it will also act as a feeder system to high capacity metro. The three coach trains will have the capacity of carrying 300 passengers and this system will have a dedicated path separating the road traffic with it.

Nasik Tender of the LRT: Nasik Metro is an innovative Mass Rapid Transit Project which will provide state of the art transportation facility to the people of the Nasik city. This project will be operated by Maharashtra Metro Rail Corporation Limited (MAHA METRO) and owned by the Government of India, Government of Maharashtra and CIDCO. The first phase under development will have two corridors, the corridor one is Gangapur to Mumbai Naka with the route length of 10km and with the 10 stations, the corridor two is Sirmik Nagar to Nasik Road with the route length of 22km and with the 15 stations.



Global LRT Projects and Their Success:

Globally , Light Rail Transits are on the rise and quite popular, such as :

Germany: Germany possesses the most light rail systems of any country in Western Europe that exceeded in the world only by Russia and other parts of the former Soviet Union. Germany , also a leader in rail transit system has utilized the LRT systems to good effect and it has used these systems in many cities .
France: Transit systems are very popular in French cities and urban regions, including metros and, increasingly, various forms of LRT, especially tramways. Paris's legacy metro system uses both steel-wheel rail rapid transit and the French rubber-tired Gadgetbahn technology; some other cities use the rubber-tired metro or operate light metros using the French VAL (Vehicle Automatique Leger), with small, automated rubber technology.

United Kingdom: Britain has an extensive legacy network of rail transit systems – particularly Redlans Passenger Rail System and rail rapid transit metros in London and Glasgow. In addition, there is the urban legacy LRT tramway system in Blackpool. One of the most important new systems has been London's Docklands Light Railway, an automated light metro using basically LRT-type rolling stock.

China: China has a dense system of intercity railway services and regional and urban rail transit. Beijing, Guangzhou, Shanghai, Hong Kong, and Tianjin are all served by rapid rail metros. Various cities are moving to install light metro and LRT, including tramways. Dalian, Changchun, and Hong Kong also operate legacy tramway systems and further the legacy tramway in Anshan is reportedly undergoing rehabilitation and modernization.

Japan: Japan is another country interlaced with a dense network of intercity railways and urban and regional rail transit systems. In addition to RPR, a number of Japanese cities and regions have long been operating legacy metros and LRT tramway and interurban systems; Now Japan may be awakening to the "light rail revolution" that has flourished in Europe and North America.

Besides the Development countries , even the developing countries are focused on installing these systems :

Development of LRT in developing Countries:

Mauritius: Mauritius Metro Express Project is a 26-km route, which will connect Curepipe to Immigration Square in Port Louis and will feature 19 stations, 2 of which will be state-of-the-art elevated stations. The alignment will connect three major bus interchanges enabling a multimodal urban transit solution

Indonesia: The Palembang Light Rail Transit (LRT) being developed in Palembang, the provincial capital of South Sumatra, Indonesia, is the first ever light rail system to be developed in the country, the Palembang LRT system has a length of 23.4km and connects the Sultan Mahmud Badaruddin II (SMB II) International Airport with Jakabaring Sports Complex it acts as a direct link between the airport and the sports complex and reduces travelling time between the two locations by between 30 and 45 minutes.

Sri Lanka: The Light Rail system will connect 16 stations between Malabe and Fort and is expected to reduce travelling time to about 32 minutes. The tracks will be constructed mainly on the existing roads. The project is expected to assist in reducing traffic jams and also provide a safe transport system for the urban population which has been rapidly increasing in the recent past. The first phase will include the construction of a 15.8km stretch between Colombo Fort area and Malabe, while later phases will expand into the Western Megapolis region. The fully electrified network will be built at an elevation of 6m above ground.

Conclusion: Light rail transit has become a fixture in many cities around the world and is now being recognized as the most promising system for Tier 2 and Tier 3 cities. With new initiatives in India for the "METROLITE" systems , We expect this system to be adopted in multiple cities in the near future.

Kochi to get METROLITE soon; India

Trams were the preferred Mode of Transport from 1890s to 1940s till they were withdrawn in Favour of Buses and Cars, which ended up polluting the Atmosphere and causing frequent Accidents.

By [Narendra Shah](#); 05/01/2020; Metro Rail News



Artist's Impression for *METROLITE*

KOCHI (Metro Rail News): Mass Rapid Transport (MRT) Experts advocate the 'Metrolite' (light urban rail) system for the Kochi metro's Kakkanad and other extensions. The Centre exercised restraint while approving the costly conventional metro rail projects in various States and prompted the Metrolite system and it leaves a minuscule carbon footprint and cost approximately a quarter of the project cost of the metro rail system.

Centre has readied a policy to promote [Metrolite systems](#) like trams, which can operate on the existing arterial roads. Within trams, there are conventional trams that operate on rails and newer systems which do not need tracks.

A technical expert who was associated with numerous metro rail initiatives in India said that the trackless systems in which the trams have rubber wheels like buses are operational in several world cities including in China. Trams rely on sensors to move along a pre-determined track. Such technological advancements have considerably lessened the cost of Metrolite systems.

The clamour for systems like trams comes in the wake of the realisation that the conventional metro rail system costs over ₹250 crores per km. Trams that operate at comparable speeds as those of the metro offer similar comfort and have much lesser ticket fares.

The advantage of track-less trams which carry over double the number of passengers in a bus is that they can negotiate sharp curves just like buses, doing away with the need to acquire land.

This apart, a basic shelter for commuters to wait is all that is required at the centre of the road, facing tramways on either side, unlike heavy concrete structures that are needed for elevated or underground metro stations.

A few lakh tonnes of concrete are needed for metro rail systems for piles, pile caps, pillars, and girders. Tram shelters can be built every 600 m or so due to their simple construction style, benefiting more number of commuters than the metro.

The doing away with elevated/underground track, minimal land acquisition [in case it is needed] etc., offer the added advantage of carrying out little or no physical change on the urban landscape. It also does away with extensive security checks and deployment of a massive workforce to man station buildings. Neither do they have 'barriers' to surmount like steps and escalators in metro rail stations.

Trams can rely on flash-charging method to recharge their batteries during a halt at stations. Such Metrolite tramways are good for low-density cities like Kochi, where capital-intensive metro rail systems need not get sound ridership. Such systems are comparable to high-capacity bus systems, with similar flexibility as far as extensions and diversions are concerned. All this bring about faster project implementation in a sustainable manner at a much lesser cost, while catering for more commuters than the metro, he observed.

Trams were the preferred mode of transport from 1890s to 1940s till they were withdrawn in favour of buses and cars, which ended up polluting the atmosphere and causing frequent accidents.

Nitin Gadkari dubs India as 'Goldmine' for Ropeways asking Doppelmayr to tap Opportunities; India

Written By: **PTI** Updated: Mon, Nov 05, 2018 09:25 pm PTI

Describing Ropeways Potential in India as "Goldmine", Union Minister Nitin Gadkari Monday urged Austrian Firm Doppelmayr Group to tap the huge Opportunities, that the Country offers.

According to an Agreement, WAPCOS and Doppelmayr will jointly conduct Feasibility Studies, prepare detailed Project Reports for Installation of Cable Cars with a view to provide modern TRransport Solutions for Decongestion and last Mile Connectivity for urban Areas and hilly and difficult Terrains.



Animation of Dehradun aerial Metro: by F.A. Wingler

Describing ropeways potential in India as "goldmine", Union Minister Nitin Gadkari Monday urged Austrian firm Doppelmayr Group to tap the huge opportunities that the country offers. Doppelmayr, the world's leading manufacturer of ropeways, has installed 60 per cent of global ropeways.

Port Rail Connectivity Corporation (PRCC) has identified 100 spots where ropeways will be beneficial, the road transport minister said while addressing an event after signing of a pact between Austria's Doppelmayr and India's WAPCOS for end to end solutions for passenger ropeway projects.

Besides, he said JNPT was going for tender for a ropeway project. "Prime Minister Narendra Modi's new India vision can be actualised through this transport revolution," he said and urged Doppelmayr to follow 'Make in India' policy.

"I will request you should take initiative to manufacture all types of material here under Make In India... This is going to reduce the cost" Gadkari termed ropeways as innovating transport system that can revolutionise traffic solutions especially in hilly states like Jammu & Kashmir, Uttarakhand, Arunachal Pradesh and Himachal Pradesh besides tier II and III cities.

"I will suggest this is a goldmine (ropeways and other such systems) given population increase. Technology is economically viable ...It has huge potential. Power is available here. "Port Rail Connectivity Corporation is there. They are doing railway line works worth Rs 40,000 crore. They can also mandate this. State governments can go on nomination basis...There are various options provided by the company right from ropeways to funicular railway, aerial tramway, Gondolas and cables," Gadkari said.

Describing ropeways as a revolutionary concept for most hilly areas, Gadkari said Uttarakhand has come with a proposal for its installation of 10 places which will be looked into, provided the state offered land clearances and other regulatory clearances. He said for villages and cities with 5-8 lakh population, it was need of the hour and would not only battle pollution in tier II and III cities besides metropolises but also cut down on India's huge crude import bills to the tune of Rs 8 lakh crore per annum.

He said ropeways will revolutionise the transport sector as its cost was about 50 crore per km as compared to Rs 350 crore for metro and hydro power is available besides electricity. Such innovative technologies were badly needed in India, given 22 per cent annual growth in automobile and aviation sectors, he said, adding that to cater to the spurt of automobiles, a separate highway lane would not cost less than Rs 88,000 crore which was unviable.

Gadkari said, this is a historical day as it will change the face of urban transport in the country. Cable cars and ropeways have already proven to be successful in Bolivia, Vietnam, Switzerland and many other countries. The government is exploring the use of new kinds of vehicles like hybrid aeroboats that combine land, water and aviation technology and can run on land, water and air at speeds greater than 80 km per hour.

The minister also informed that ten National Waterways, including Ganga, are being developed for transport. It will soon be possible to carry goods from Varanasi to right up to Bangladesh and the northeastern states on waterways. He said it took almost two years to reach the agreement with Doppelmayr as discussions were started during his visit to the World Economic Forum in Davos.

Michael Doppelmayr, Chairman of the Group, said the technology has relevance for India and has done extensive work right from Switzerland to Nigeria. The memorandum of understanding (MoU) was signed by RK Gupta, MD, WAPCOS and Vikram Singhal, MD and CEO, Doppelmayr India.

The MoU will enable development of ropeway projects in various states using globally accepted standards for passenger safety and reliability.

According to the agreement, WAPCOS and Doppelmayr will jointly conduct feasibility studies, prepare detailed project reports for installation of cable cars with a view to provide modern transport solutions for decongestion and last mile connectivity for urban areas and hilly and difficult terrains.

The Austrian company has set up about 15,000 ropeway installations across the world and the UN Habitat has also tied up with it to address the urban decongestion at global level. WAPCOS, a state-owned entity, is an Indian multinational with footprints across the globe.

ITES to submit Light Metro and Ropeway Draft Project Report, DPR, for Varanasi; India

RITES has submitted a Draft Project Report, which is pegged at Rs. 12,000 Crore for smooth Traffic by 2041 assuming the City's Population to be 38 lakh.

By [Narendra Shah](#); 30/12/2019; Metro Rail News



Varanasi plans for Cable Car; Animation by F.A. Wingler

VARANASI (Metro Rail News): RITES Limited has now finalized the routes for **Light Metro Rail and Ropeway Project** for Varanasi after receiving in-principal approval from Prime Minister's Office.

The Ministry of Urban Development has given the funding consent to the comprehensive Mobility Plan (CMP) after the in-principle approval of the Prime Minister's Office (PMO). The route and the action plan laid down before the project was approved, were presented by the RITES officials in a meeting chaired by the commissioner. The [Light Metro](#) rail and ropeway facility will be available on the outskirts of the city. The old city i.e. Pakka Mahal is kept separate from it.

RITES has [submitted](#) a draft project report which is pegged at Rs 12,000 crore for smooth traffic by 2041 assuming the city's population to be 38 lakh. This will also provide direct and indirect employment to a large number of unemployed people.

According to the proposal prepared by RITES, the light metro will operate from BHEL to BHU in Tarna. It will have 14 to 16 stations. At the same time, the route of the ropeway will be from the main Godoulia intersection of the city to Rath Yatra, beyond the Varanasi railway station to Khidkia Ghat. There is a plan to build the first Transport Hub site of its kind first time in the country at Khikkia Ghat.

Apart from this, the route is proposed through the Varuna Corridor from Windows Ghat to Cantt. RITES has also proposed to operate common buses including **Rapid Buses** in the city.

DMRC submits DPR for two proposed Metrolite Corridors; India

A Metrolite Train, which will have three-Coach Sets and will comfortably accommodate 300 Passengers at a Time, will be sufficient to handle the Passenger Traffic on this Route.

By [Narendra Shah](#); 10/01/2020; Metro Rail News



Artist Concept for Delhi METROLITE Corridor

NEW DELHI, India (Metro Rail News): Delhi Metro Rail Corporation (DMRC) has submitted detailed project reports for the two proposed Metrolite corridors i.e. Rithala to Narela (21.7 km) and [Kirti Nagar to Dwarka](#) ECC (Exhibition-cum-Convention Centre) in Sector 25 (19 km) — to Delhi Government for approval.



Two proposed Metrolite Corridor

DMRC expects to complete the two projects within three years after getting a nod from the government and the Centre. The Rithala-Narela corridor is expected to come up first. Unlike metro corridors, [Metrolite](#) will be a light rail project that will mostly run on the road surface.

However, unlike similar projects in other cities around the world that share road space with other modes of transport, the Rithala-Narela and Kirti Nagar-Dwarka ECC Metrolite corridors will have dedicated corridors that are fenced on both sides. DMRC has gone for dedicated, fenced corridors as sharing road space with other vehicles would have reduced the train's average speed considerably.

While it was earlier expected that apart from the Rithala-Narela section, two other proposed Phase-IV corridors of Delhi Metro — Lajpat Nagar-Saket G Block (7.9 km) and Inderlok-Indraprastha (12.5 km) — would also get Metrolite corridors, these have not been found feasible and will have metro services.

According to [Delhi Government](#) officials, DMRC found out that on both the Lajpat Nagar-Saket G Block and Inderlok-Indraprastha corridors, Metrolite wouldn't be able to handle the expected passenger traffic. The Rithala-Narela Metrolite project will cost Rs. 2,914 crore, out of which Delhi Development Authority is expected to provide Rs. 200 crore as the corridor will provide some much-needed connectivity to its Narela sub-city.

Apart from Narela and different sectors of Rohini, the corridor will also pass through areas like Bawana, Puth Khurd, Sanath, Bhorgarh and Anaj Mandi. Sources said that unlike metro systems, which are more capital intensive, Metrolite has simpler infrastructure, which brings down the cost. As the corridor will run mostly on roads, the cost that could be incurred for elevated or underground corridors will not be included. The Kirti Nagar-Dwarka ECC Metrolite corridor is not part of DMRC's Phase-IV project, but a standalone corridor will originate from the Kirti Nagar interchange station, connecting the corridor to the Blue (Dwarka-Noida City Centre) and Green (Inder Lok-Brig Hoshiar Singh) lines.

On the other end, the corridor will be connected to the high-speed Airport Express Line, which is being extended from Dwarka Sector 21 to Dwarka ECC in Sector 25. The project

cost of the second corridor is Rs. 2,673 crore and apart from Kirti Nagar and different sectors of Dwarka, it will pass through areas like Saraswati Garden, Mayapuri, Hari Nagar, Shiv Puri, Dabri, Sitapuri Extension, Mahavir Enclave and Dhool Siras Village

A Metrolite train, which will have three-coach sets and will comfortably accommodate 300 passengers at a time, will be sufficient to handle the passenger traffic on this route. As per DMRC's DPR, two sets could be joined to make a six-coach train in case of increased demand. The system will draw power from overhead traction.

Even though the corridors are yet to receive Delhi government or the Centre's approval, DMRC has initiated the process of procuring 22 Metrolite coaches for the Kirti Nagar-Dwarka ECC corridor to save time. DMRC will rope in a firm that will design, manufacture, supply, test and commission the Metrolite trains, apart from providing comprehensive maintenance up to 15 years for the **standard gauge trains** and a train depot.

AP CM Jaganmohan Reddy to implement Tram on Tyres in Visaghapatnam; India

Earlier, the A. P. Government had earlier decided to complete the Vizag Metro Project, covering 140 km, in three Phases. The first Phase, covering 46.42 km, is expected to be taken up in three Corridors.

By [Narendra Shah](#); 10/01/2020



Artist Concept for Tram on Tyres

VISAKHAPATNAM, India (Metro Rail News): Andhra Pradesh Chief Minister, YS Jagan Mohan Reddy directed the officials to develop a 60 km-long trackless tram system as part of [Vizag Metro Rail Project](#) in a review meeting with the Visakhapatnam District Collector, V Vinay Chand, in Amaravati, on Wednesday.

Earlier, The A. P. Govt. had earlier decided to complete the [Vizag metro project](#), covering 140 km, in three phases. The first phase, covering 46.42 km, is expected to be taken up in three corridors. These are Steel Plant to Kommadi (via Gajuwaka, NAD, Gurudwara, and

Hanumanthawaka), Gurudwara to the Old Post Office, and Tatichetlapalem to Rama Krishna (RK) Beach.

In order to reduce the financial burden on the State Government, and yet offer an effective means of public transport, the trackless tram system will be developed to connect RK Beach and Bheemili, NAD and Pendurthi and other sparsely populated areas. These will be executed as a part of the second and third phases of the project.

The Chief Minister reviewed the [trackless tram models](#), which were previously implemented in other parts of the world during the meeting. The officials were asked to prepare a fresh Detailed Project Report (DPR) for the proposed network, falling into the jurisdiction of Visakhapatnam Metropolitan Region Development Authority (VMRDA).

Discussing the land allotment to the poor in Vizag District, the Collector informed the CM that 66,000 such underprivileged people have been identified from the rural areas, who can receive housing plots. The identified beneficiaries, from rural areas, will be given plots in 1.5 cents and those from the city will get 1 cent of the land. Reportedly, a total of 6,000 acres from Anandapuram, Padmanabham, Pendurthi, Sabbavaram, Peddagantyada, and Gajuwaka Mandals will be allocated for this purpose.

Greater Visakhapatnam Municipal Corporation (GVMC) Commissioner, G Srijana, Visakhapatnam Metropolitan Region Development Authority (VMRDA) Commissioner, P Koteswara Rao, and Amaravati Metro Rail Corporation Managing Director, NP Ramakrishna Reddy, were also present at the meeting.

Decks cleared for revise Metro Rail Project in Visakhapatnam; India

The two-Phase, 80 km Facility is estimated to cost ₹16,000 Crore.

By [Narendra Shah](#); 12/01/2020; Metro Rail News

Visakhapatnam (Metro Rail News): The decks have been cleared for the revised Visakhapatnam Metro Rail Project ahead of the decision to shift Secretariat to Visakhapatnam.

The government is planning to extend the metro rail stretch from 42.55 km to 80 km.

The government is planning to bring in the [tram system](#) apart from the metro rail. Tram system will be utilised in areas where traffic is lesser compared to that in the metro corridors.

“A detailed study of traffic from Anakapalle to Bhogapuram had already been conducted by the Urban Mass Transit Company (UMTC)” Said N.P. Ramakrishna Reddy Amaravati Metro Rail Corporation (AMRC) Managing Director.

Further, he said that We are proposing Metro Rail in the areas where traffic is high. The remaining places, where there is lesser traffic, we are planning to come up with trams. The Detailed Project Report (DPR) will be completed in six months, and the groundwork is expected to begin in 10 to 12 months.

“Once executed, the 80 km Metro Rail project from steel plant to Bhogapuram airport will be the biggest of its kind in the world,” Mr. Ramakrishna Reddy claimed.

Earlier, the Hyderabad Metro Rail was touted to be the biggest with 72 km stretch.

The government is currently in the process of identifying a consultant to prepare the DPR.

‘Less financial Burden’

Unlike in the previous model, the government is planning one that entails least financial burden on the exchequer.

“The idea is to have the least government spend by giving concessions and land to the executing company. I’m confident of making the project most viable despite financial hurdles. We could convert the Hyderabad International Airport, Shamshabad, which was initially thought to be the most enviable one, as financially most viable,” Mr Ramakrishna Reddy added.

For the record, Mr. Reddy had played a key role in the implementation of the international airport in the combined State.

‘Rechargeable Trams’

The government is keen on developing trams in stretches totalling 60 km – NAD to Pendurthi, steel plant to Anakapalle and Old Post Office to Bheemili via Rushikonda on the Beach Road. These trams are most likely to be rechargeable ones.

“We have such trams in some of the advanced countries. Our CM is interested in having such a system here. These sophisticated trams can charge their batteries within a few minutes of their halt at stations,” Mr. Ramakrishna Reddy said.

He put the estimated cost of trams at ₹100 Core to ₹120 Crore per km.

It is given to understand that the government also proposes to change the name of AMRC to **Andhra Pradesh** Metro Rail Corporation to suit its activities across the State.

DPR to be prepared for Tram-like public Transport System in Visakhapatnam; India

January 8, 2020 Rail News



Visakhapatnam: Chief Minister YS Jagan Mohan Reddy on Monday directed officials to prepare a Detailed Project Report (DPR) for tram-like public transport system from Ramakrishna Beach to Bheemili in Visakhapatnam.

More Information:

- The Chief Minister directed officials to expedite all development works in Visakhapatnam.
- He reviewed the status of the Visakhapatnam Metro Rail Project.
- The CM suggested that a tram-like public transport system be developed covering the stretch from Ramakrishna Beach to Bheemili abutting the coast.
- A consultancy firm will be appointed soon to prepare the DPR for the set-up of a tram-like public transport system across the RK beach to Bheemili.

Panel prepared to outline Standard, Specification for “METRO ON TYRES” Hardeep Singh Puri; India

Panel prepared to outline Standard and Specification for "Metro on Tyres".

By [Aradhana Patel](#); 12/10/2019; Metro Rail News

NEW DELHI (Metro Rail News): Union & Housing Development Minister Hardeep Singh Puri said on Friday, October 11. Panel prepared outline standard, specification for “Metro on Tyres” which runs on rubber tyres instead of steel wheels like Metro Rail or [Metrolite](#).

According to officials, the per kilometre cost of Metro Rail is 300 crore & 200 crores for [Metrolite](#) but “Metro on Tyres ” will cost 60 crores “Metro on tyres” is much cheaper than both the Metro Rail and Metrolite.

The Minister told reporters, We have formed a committee to finalise a set of standards and specifications for the metro on tyres. When they come out with their report there will be a

process of approval and then will be presented in the public domain for states to adopt. We have not frozen on the standards and specifications for it yet.

He also said that the Metrolite has been approved by the ministry and the Board of the Delhi Metro has also given its nod for its use in a 20 km stretch from Dwarka sector 25 to Kirtinagar. Now, the ministry will await the proposal to come from the Delhi government to use it.

A similar process, he said will be followed in case of "metro on tyres".

In August this year, the Maharashtra cabinet cleared the mass transport system 'Metro Neo' for better connectivity across Nashik.

However, Nashik will have to wait for the report of the committee and the final approval from the union ministry before it begins building, the Union Housing and Urban Affairs Secretary Durga Shankar Mishra said.

According to the Nashik model, its "metro on tyres" will have an elevated corridor and its coaches will operate on electricity and battery and ply on elevated viaducts with state-of-the-art terminals.

"Nashik are the prime movers in this case and its from there that we got the idea. However, they have to wait for the standards and specifications," said Mishra.

Hyderabad Metro gets Safety Clearance for JBS-MGBS Route; India

The Safety Certificate issued by CMRS has cleared the Way for the Introduction of Passenger Services on the last Corridor of Hyderabad Metro Rail Project Phase-1.

By Narendra Shah; 12/01/2020; Metro Rail News



Hyderabad Metro

HYDERABAD (Metro Rail News): Commissioner of Metro Rail Safety (CMRS) issue Safety Certificate to L&T Metro Rail Limited for the launch of commercial operation on Jubilee Bus Station (*JBS*) and Mahatma Gandhi Bus Station (*MGBS*) route.

The CMRS Shri J K Garg has inspected JBS-MGBS Metro Corridor-2 along with HMRL MD, NVS Reddy and senior engineers and technical experts of L&T MRHL and also an independent engineer, Louis Berger over the past three days and issued the mandatory Safety Certificate.

After examining the safety certification of the 25kV Overhead electrical traction and other electrical installations by CEIG (Chief Electrical Inspector General), Fire clearance for the nine stations of the corridor by the Director General, Fire Services, signaling and **CBTC** train control systems by **Thales**, Canada, Internal Safety Assessment by **Halcrow**, UK and the results of the tests of various technical parameters during trial runs etc., the CMRS thoroughly inspected the corridor.

Mr. Garg covered all safety tests related to viaduct, track, signaling, telecom, trains and electric traction system, speed trials at high speed to check train behaviour, station structures, lifts and escalators, entry/exit points, ticketing systems, control rooms and passenger amenities and also checked Bhoiguda Metro ROB, bearings and viaduct during his inspection.

The Safety Certificate issued by CMRS has cleared the way for the introduction of passenger services on the last corridor of Hyderabad Metro Rail project phase-1. The corridor with a length of 11 km has nine stations, JBS-Parade Grounds, Secunderabad West, Gandhi Hospital, Musheerabad, RTC x roads, Chikkadapally, Narayanguda, Sultan Bazar and MGBS.

Receiving the Safety Certificate, Reddy said the Government will decide the date of inauguration soon.

Mumbai Metro Rail Corporation, MMRC, plans to get 15% Revenue from non-Fare Options to post Underground Corridor; India

MMRC wants to connect residential or commercial Complexes within a 500 m Radius of Metro Stations via Underground Subways.

By [Narendra Shah](#); 11/01/2020; Metro Rail News



Mumbai Metro Line 3

MUMBAI (Metro Rail News): Mumbai Metro Rail Corporation (MMRC) Authority is exploring non-fare revenue options as the city builds its first underground corridor i.e Mumbai Metro Line 3.

If all goes as per plan, the direct subway will be built to access the nearest metro station from the office in a one-time fee. A 33 Km long Mumbai Metro Line 3 connects the city's airport terminals and three prominent business districts. We have received 12 expressions of interest (EOIs) submissions for direct access said an MMRC official.

The [Mumbai Metro](#) Rail Corporation (MMRC) is approaching developer associations in and around Bandra-Kurla Complex (BKC), Lower Parel, and the international airport to provide residential and commercial complexes easy access to Metro-3 stations through the direct subway.

The corporation aims to interact with hotels and commercial offices near the international airport to enable direct access to the T2 station. [MMRC](#) is in talks with the BKC Property Owners' Association, and the Mumbai Mile Regeneration Association (MMRA), a non-profit organisation of developers, residents' associations and corporates in Senapati Bapat Marg, for the BKC and Science Museum stations, respectively.

MMRC wants to connect residential or commercial complexes within a 500-metre radius of Metro stations via underground subways.

While MMRC will facilitate the construction of the subway, the cost has to be borne by the bidder. MMRC, which floated the EOI in November, has received 12 bids from seven developers like K Raheja Corp, DB Realty, Wadhwa, Oberoi and Indiabulls for the BKC, T2, Worli, Science Museum and Acharya Atre Chowk stations. An official from MMRC said, "We will now prepare a detailed project report for each of the underground subways."

"The construction of an underground subway is an expensive proposition. It will be feasible for more than two developers to pool their funds for the subway. Also, as the construction is already underway, it is the right time to undertake these collaborations," said R Ramana, executive director, MMRC.

According to MMRC's EOI, the underground subways can cost ₹10 lakh-₹12 lakh for every metre. The cost can differ on the basis of the length and location of the subway. The

developers will also be expected to pay a one-time premium and maintenance expenses to MMRC.

Jayesh Shah, president, BKC Property Owners Association, said, “Although we are yet to see the plan, it is a good proposition as it will encourage people to use public transport and ease traffic congestion in BKC.”

MMRC REACHES OUT TO CORPORATES

MMRC, which has floated an EOI for station name rights, is also reaching out to corporate firms located near stations. Station name rights refer to brand names used as a suffix or prefix to the station’s name. It is a common practice to generate non-fare revenue, even internationally. “There are many corporate offices or outlets next to the stations like Zara near Flora Fountain, Mahindra near Acharya Atre Chowk or Phoenix Mills near the Science Museum station, which can look at acquiring station name rights,” said an MMRC official.

Mumbai Metropolitan Region Development Authority, MMRDA, to build avant-grade Double-Decker Metro Depot; India

The Manadle Depot will have two Floor Levels for the Stabling of Metro Trains making optimal Use of Land in Line.

By Narendra Shah; 10/01/2020; Metro News



MMRDA-owned Corporation likely to operate Navi Mumbai Metro

MUMBAI, India (Metro Rail News): A Avant-grade Double-decker Metro depot is setting up at Mandale to caters the requirement of Metro line 2A, 2B and 7 by Mumbai Metropolitan Region Development Authority (MMRDA).

To wash the metro coaches, an automatic coach wash plant will be installed in the depot at the entry/exit point of the mainline. The depot will be constructed in 31 hectares of the land parcel and it will have a waste-water treatment plant that can recycle the water used for washing metro trains.

Once the depot is ready, it can accommodate a total of 72 trains comprising eight coaches at the same time. The total track length inside the Mandale depot will be 27 kilometers.

Moreover, it will have an auto coach wash plant for washing metro coaches. Once the spacious depot is ready, it can accommodate 72 trains, comprising of eight coaches, ie a total of 576 coaches at the same time. The depot will be a state-of-the-art car depot, which will be eco-friendly, green and energy-efficient.

According to the plan, the Manadle depot will have two-floor levels for the stabling of metro trains making optimal use of land in line. However, the concept for making elevated depot is developed by Delhi Metro Rail Corporation (DMRC) at Vinod Nagar and Kalindi Kunj to stable the trains which are running on Line 7 (Shiv Vihar – Majlis Park) and Line 8 (Janakpuri West – Botanical Garden) of Delhi Metro Rail network.

According to the plan, the Mandale depot will be catering to three different metro lines of Mumbai Metro Rail network being implemented by MMRDA — Line 2A (Dahisar to D N Nagar, 18.589 km), Line 2B (DN Nagar to Mandale is 23.643 km) and for Line 7 (Andheri East to Dahisar East, 16.475 km).

In addition to the above, the depot will have a total of nine inspection bays, of which six will be constructed to accommodate eight-coach metro trains and three will be for the accommodation of six-coach trains.

Second Tunnel Boring Machine, TBM S79, commissions in Pune Metro by Gülermak-TPL JV; India

Shinde has inaugurated Tunnel Work and Tunnel Boring Machine (TBM) by pressing the switch of TBM S79 Mula (names after River Mula) and the Cutter Head of the Machine started rotating.

By [Narendra Shah](#) 08/01/2020; MetroRail News



Minister of Urban Development, Government of Maharashtra Eknath Shinde inaugurated the second Tunnel work by Tunnel Boring Machine

PUNE (Metro Rail News): The Pune Metro Team of Gülermak–Tata Projects Limited Joint Venture (Gülermak-TPL JV) has commissioned the second TBM S79 “Mula” to build a tunnel from Range Hills Ramp towards Agriculture College Shaft after achieving the [first tunnel breakthrough](#) in at the beginning of the new year 2020.

Shri Eknath Shinde, Minister of Urban Development, Government of Maharashtra inaugurated the second Tunnel work by Tunnel Boring Machine (TBM) named after River Mula at [Agriculture college](#) Pune on January 5, 2020. The second TBM S79 “Mula” will drag a 5-km underground stretch between Range hill to Swargate of the PCMC (Pimpri Chinchwad Municipal Corporation)-Swargate corridor.

The Maharashtra Metro Rail Corporation (Maha Metro) is employing the tunnel boring machine (TBM) to dig two parallel tunnels between the range hill and Swargate. The first tunnel work was [started](#) on 30 November 2019 by the tunnel boring machine S78 named after river Mutha.

Shinde has inaugurated tunnel work and tunnel boring machine (TBM) by pressing the switch of TBM S79 Mula (names after river Mula) and the cutter head of the machine start rotating. After that, he climbs down 20m deep into the TBM shaft and inspected the machine and tunnel work from close. Atul Gadgil, Director (works) accompanied him and explained the tunnel work and the features of the tunnel boring machine.

While addressing the gathering, Shinde said that the metro work is complex, difficult, high tech and sophisticated; the TBM Mula machine is fully computer-controlled and there is no human error associated with it. Metro administration is taking adequate safety measures in tunnel work. I am sure that Pune Metro will finish the work before time. The Government of

Maharashtra will eliminate all hurdles and help Maha Metro to complete the work before time. Maha Metro is doing good work in Nagpur, Pune and Metro for Nashik city will also in advance stage of approvals.

“I congratulate the Maha Metro team and their MD [Dr. Brijesh Dixit](#) for the excellent work. The metro will help the Pune citizen to commute in less time and reduce pollution in the city”, he added.

This Ø 6.61 m 100m long Terratec EPB TBM S79 completed factory acceptance tests in October 2019 and arrived on the Pune Metro rail site in December 2019.



Inauguration of Pune Metro

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE



Rise of Light Rail Projects worldwide; why Indian Government plans to adopt LRT, Global and Indian Initiatives; Global, India

December 9, 2019 Articles; Rail Analysis India

Globally, Light Rail Transits are on the rise and quite popular



Artist's Concept of "NEXT GENERATION TRAM/LRV" by Stadler

Introduction:

Nowadays with the rising concern over the viability of the cost of metro rail projects, especially in smaller cities, the Central government of India is planning to promote Light Rail Transit System as an alternative mass rapid transport system in urban areas.

Light rail transit (LRT) is a form of urban rail transit using rolling stock similar to a tramway, but operating at a higher capacity, and often on an exclusive right-of-way. Light rail transit (LRT) is a medium capacity mode of mass rapid transport which straddles between the heavy capacity Metro rail and the low capacity bus services.



Metro / LRT / BUS Comparison:

LRT is a form of rail transit that utilizes equipment and infrastructure that is typically less massive than that used for heavy rail modes i.e. commuter/regional, and metro rail/subway. A few modes such as people movers and personal rapid transit could be considered as even “lighter”. LRT may be at grade, partially grade-separated or completely elevated.

Light rail vehicles generally have a top speed of around 100km/h though mostly operating at much lower speeds, kind of like the road vehicles.

Why Indian Government plans to adopt LRT:

To boost the public transportation system in cities, the Indian Central Government is planning to bring a new mass transport system called Light Rail Transit. This system , also

to be known as , Metrolite could become a dedicated rapid rail corridor in cities and towns with tracks on the surface instead of elevated or underground stretches as is the case with metro rail corridors across the country. The centre's Housing & Urban affairs ministry had prepared the plan and finalized the standards and specifications for Metrolite and has sent them for review to the Railways .

The BJP in its poll manifesto of 2019 has promised to introduce metro rail system in 50 cities of the country. The conventional metro rail system, which requires huge capital investment, may not be viable in many smaller cities coming under the tier-II and tier-III category. According to the current population, there would not be enough ridership as well. In these cases the centre can think for Light Rail System – Metrolite, which will be suitable at much less cost and will also act as feeder services from various parts of the city. As per the present status , approx 657kms of metro rail network is operational across the country and another 800kms is under construction in 27 cities.

Initiatives in India :

Delhi Tender of the LRT: The government is planning to introduce the Light rail transit system for the remaining 3 corridors of the phase 4 project of the Delhi Metro This will also reduce the cost by 25 to 45 per cent compared to the existing metro systems . A high level meeting was held to discuss the adoption of light rail transit system standards for the remaining 3 corridors that are Inderlok to Indraprastha, Lajpat Nagar to Saket G block, Rithala – Bawana – Narela.

The Union Housing and Urban Affairs Ministry and the Board of the Delhi Metro have approved the Light rail transit system on a 20km stretch from Dwarka sector 25 to Kirtinagar. Besides the cost saving, it will also act as a feeder system to high capacity metro. The three coach trains will have the capacity of carrying 300 passengers and this system will have a dedicated path separating the road traffic with it.

Nasik Tender of the LRT: Nasik Metro is an innovative Mass Rapid Transit Project which will provide state of the art transportation facility to the people of the Nasik city. This project will be operated by Maharashtra Metro Rail Corporation Limited (MAHA METRO) and owned by the Government of India, Government of Maharashtra and CIDCO. The first phase under development will have two corridors, the corridor one is Gangapur to Mumbai Naka with the route length of 10km and with the 10 stations, the corridor two is Sirmik Nagar to Nasik Road with the route length of 22km and with the 15 stations.



Global LRT Projects and Their Success:

Globally , Light Rail Transits are on the rise and quite popular, such as :

Germany: Germany possesses the most light rail systems of any country in Western Europe that exceeded in the world only by Russia and other parts of the former Soviet Union. Germany , also a leader in rail transit system has utilized the LRT systems to good effect and it has used these systems in many cities .· **France:** Transit systems are very popular in French cities and urban regions, including metros and, increasingly, various forms of LRT, especially tramways. Paris's legacy metro system uses both steel-wheel rail rapid transit and the French rubber-tired Gadgetbahn technology; some other cities use the rubber-tired metro or operate light metros using the French VAL (Vehicle Automatique Leger), with small, automated rubber technology.

United Kingdom: Britain has an extensive legacy network of rail transit systems – particularly Redlans Passenger Rail System and rail rapid transit metros in London and Glasgow. In addition, there is the urban legacy LRT tramway system in Blackpool. One of the most important new systems has been London's Docklands Light Railway, an automated light metro using basically LRT-type rolling stock.

China: China has a dense system of intercity railway services and regional and urban rail transit. Beijing, Guangzhou, Shanghai, Hong Kong, and Tianjin are all served by rapid rail metros. Various cities are moving to install light metro and LRT, including tramways. Dalian, Changchun, and Hong Kong also operate legacy tramway systems and further the legacy tramway in Anshan is reportedly undergoing rehabilitation and modernization.

Japan: Japan is another country interlaced with a dense network of intercity railways and urban and regional rail transit systems. in addition to RPR, a number of Japanese cities and regions have long been operating legacy metros and LRT tramway and interurban systems; Now Japan may be awakening to the "light rail revolution" that has flourished in Europe and North America.

Besides the Development countries , even the developing countries are focused on installing these systems :

Development of LRT in developing Countries:

Mauritius: Mauritius Metro Express Project is a 26-km route, which will connect Curepipe to Immigration Square in Port Louis and will feature 19 stations, 2 of which will be state-of-the-art elevated stations. The alignment will connect three major bus interchanges enabling a multimodal urban transit solution

Indonesia: The Palembang Light Rail Transit (LRT) being developed in Palembang, the provincial capital of South Sumatra, Indonesia, is the first ever light rail system to be developed in the country, the Palembang LRT system has a length of 23.4km and connects the Sultan Mahmud Badaruddin II (SMB II) International Airport with Jakabaring Sports Complex it acts as a direct link between the airport and the sports complex and reduces travelling time between the two locations by between 30 and 45 minutes.

Sri Lanka: The Light Rail system will connect 16 stations between Malabe and Fort and is expected to reduce travelling time to about 32 minutes. The tracks will be constructed mainly on the existing roads. The project is expected to assist in reducing traffic jams and also provide a safe transport system for the urban population which has been rapidly increasing in the recent past. The first phase will include the construction of a 15.8km stretch between Colombo Fort area and Malabe, while later phases will expand into the

Western Megapolis region. The fully electrified network will be built at an elevation of 6m above ground.

Conclusion: Light rail transit has become a fixture in many cities around the world and is now being recognized as the most promising system for Tier 2 and Tier 3 cities. With new initiatives in India for the “METROLITE” systems , We expect this system to be adopted in multiple cities in the near future.

IT-TRANS 2020: Exhibitors present digital Solutions for Urban Mobility; Germany/Belgium

By [Narendra Shah](#) 08/01/2020; Metro Rail News

The smart Software Solution simplifies operational Processes, making it possible to plan Vehicle Deployment more efficiently, to exclude range Risks and also reduce Operating Costs by optimizing Workshop Processes and Maintenance.



Smart AI Solution for Depot/Workshop Process and Maintenance Management; Copyright: Trapeze

Karlsruhe/Brussels (Metro Rail News): One of the key factors for achieving climate protection targets is having a strong public transport system. As well as generally expanding public transport, it is of crucial importance to switch to emission-free modes of transport such as in bus fleets. In its Clean Vehicles Directive, the EU therefore requires public authorities to purchase a minimum quota of clean buses. This means that, as of 2021, at least 45 percent of buses must use alternative drives or run on natural gas or synthetic fuels. This quota will be increased to 65 percent as of 2026.

Using buses with electric drives rather than conventional combustion engines would reduce noise pollution as well as cutting down substantially on emissions that are harmful for the climate and human health. As Martin Schmitz, Technical Director of the Association of German Transport Companies (VDV), which has more than 600 member companies from the public passenger and rail freight transport sector, explains: “Around 315 electric buses are currently being used in Germany, with a further 750 on order. However, the difficulties involved in supplying power to depots and getting approval for building charging infrastructure in densely built-up urban areas are continuing to hamper the switch to e-mobility. After all, as well as the vehicles themselves, it is primarily a question of infrastructure and new operational processes.”

Range Calculation takes into Account Weather Conditions, Traffic Jams and Route Characteristics

Swiss company Trapeze is showcasing special solutions for e-bus fleets at IT-TRANS. The Trapeze Smart Monitor allows the vehicle status to be monitored. The system provides real-time information on all the available vehicle data such as battery charge level and possible range in hours or kilometers. The technical status of the vehicle is also recorded automatically and communicated to control room and workshop. The ongoing range calculation additionally takes into account factors influencing energy consumption such as weather conditions, uphill and downhill sections and repeated stopping and starting on account of traffic jams and diversions. In this way, the smart software solution simplifies operational processes, making it possible to plan vehicle deployment more efficiently, to exclude range risks and also to reduce operating costs by optimizing workshop processes and maintenance.

New at IT-TRANS: Control Center simulates e-Bus route Planning

The Future Mobility Lab is a new feature at IT-TRANS 2020. Among other things, a control room will be set up to simulate how electric and autonomous vehicles are integrated into a transport system that also features vehicles with drivers. The control center will be set up by the Swiss exhibitors Trapeze. The software for the integrating the self-driving vehicles in the control system is being supplied by its subsidiary AmoTech. “We will be using the control center to show you the challenges involved in managing a complex transport system. If vehicles with drivers are en route at the same time as self-driving vehicles it is important, for example, to decide – with support from the software – which bus will reach a particular stop first. In the case of driverless vehicles, information is needed as to how passengers get their tickets, how many passengers are in the vehicle and whether they are all ok”, explains Matthias Keller, Director Corporate and Marketing Communications, Trapeze Switzerland GmbH. Visitors to IT-TRANS can observe the various vehicles on the monitors in the control center, watch the dispatchers at work and ask them questions. One of the vehicles in the traffic management system at the control center is a self-driving minibus from the manufacturer easymile which AmoTech will demonstrate live on a demonstration route.

INIT presents a total Solution for introducing e-Buses

From the economic point of view, e-buses should be on the road for as long as possible. The e-MOBILE-PLAN planning and simulation system from Karlsruhe-based software house INIT enables routes and scenarios to be simulated to determine the most appropriate options. The planning tool is only one element in the e-MOBILE product suite, however. At IT-TRANS, INIT is presenting its smart solutions for charging and depot management, scheduling, range forecasting and control of e-bus fleets in ITCS.

COSware with automatic Scheduling and intelligent Fuel Management

COSware smart BMS from IT-TRANS exhibitor COS makes it easier for dispatchers at the depot to handle e-mobility. The software provides dynamic range forecasts, taking into account different factors such as weather, topography and passenger volumes. The system determines charge durations, including load balancing, documents changes regarding the state of charge and analyses aging processes concerning the battery's state of health. COSware also covers all other depot management tasks, such as automatic dispatching, intelligent maintenance planning, fuel management and location tracking. With COSware smart IMS, service technicians at the workshop can record such things as mileage and tire tread depth directly on the vehicle and report defects; regular control intervals are updated automatically.

E-mobile Ride pooling with ViaVan

ViaVan is re-engineering public transit, from a regulated system of rigid routes and schedules to a fully dynamic, on-demand network. ViaVan's BerlKönig service, in partnership with the Berliner Verkehrsbetriebe (BVG), is the largest public sector on-demand ride pooling project. Around half the fleet comprises electric vehicles, for which Via has developed new charge tracking algorithm, allowing drivers to see when they need to charge the vehicle. The New York based company has also developed comprehensive planning tools which ensure that despite charging cycles and vehicle replacements the service is never undersupplied in its operating area. The BerlKönig project won the 2019 Public and Urban Transport Strategy Award sponsored by the International Association of Public Transport (UITP). UITP is a co-organizer of IT-TRANS.

IVU. suite combines all Vehicles in one Interface

The IVU.suite enables operational factors such as charge management and charging times, ranges, route lengths, overnight and opportunity charging to be optimized, and electric buses to be seamlessly integrated in planning, scheduling and control. IVU.rail, the integrated standard system for railways, helps to make efficient use of rolling stock. The vehicle and maintenance optimization system automatically takes into account predetermined service intervals and planned maintenance. In the event of a fault, a suggestion function recommends a suitable replacement vehicles and routes. IVU.rail also optimizes personnel deployment. The IVU.crew planning solution provides support in all personnel deployments and ensures that employees are where they are needed.

Coverage monitoring Facilitates efficient Use of Resources

Verkehrsautomatisierung Berlin GmbH (VAB) also supports intelligent and demand-driven planning for e-bus fleets with IT solutions. The objectives are fast handling capabilities in daily operations and a reduction in administrative effort. Electromobility influences numerous operational processes at the depot and in the route network. VAB's smart charging management solution in combination with range monitoring ensures eco-friendly and efficient use of resources. Proven technologies can be seamlessly integrated for preconditioning vehicles, for example in the form of demand-led control of vehicle preheating.

Practical Optimization Software for electric Buses

Mentz, a Munich based company, is showcasing its GENIOS family at IT-TRANS for the first time. The program core integrates the latest research results from the fields of artificial

intelligence, evolutionary algorithms and graph theory. The GENIOS family currently includes optimizations for electric buses, integrated and sequential duty and vehicle scheduling, duty rosters, personal duty scheduling, route planning to supply stops with printed timetables, and connection planning. Parameters such as legal requirements and operational agreements can be set or even redefined by the user on the application's interface. Similarly, performance indicators to monitor optimization processes and solution proposals can be created through modular design.

Data-based Decisions for Information and Cost Transparency

Pure Vision Systems is consistently focusing on big data throughout its line of products and services, thus keeping public transport future proof and competitive. Typical applications include continuous recording of vehicle positions and meta data, information on fuel consumption and routes driven (relevant for e-mobility applications) and the creation of the basis for differentiated controlling. Data from all the on-board vehicle systems such as IBIS, passenger counting systems and vehicle CAN are recorded synchronously on the central system platform, processed and forwarded to backend systems. Depending on intended data usage, the data is processed either in real time or transferred to backend systems using block transfer.

Bogotá LRT Regio-Tram de Occidente Contract awarded; Columbia

13th January 2020 ; Metro Report International



Artist's Concept for Light Rail Regio Transit

COLOMBIA: A contract to design, build and operate the 39.6 km Regiotram de Occidente inter-urban commuter line linking Bogotá with its western suburbs was signed by China Civil Engineering Construction Corp on January 7.

The subsidiary of China Railway Construction Corp was sole bidder for the public-private-partnership contract, which runs for 26 years including 18 months for preparation, 30 months for construction and six months for testing. Passenger services are scheduled to begin in 2024.



The trams have priority at the traffic signals, and real-time is available on the trams and at the stops.

‘We are excited about the project coming to fruition’, TIG/m President Brad Read told *Metro Report International*. ‘We believe that this form of very light rail has a great potential for mid-sized cities as well as feeder systems for line-haul Interurbans in large metropolitan areas.’



The double-track, electrified 1 435 mm gauge line with 17 stations will mostly use an existing railway alignment to serve Mosquera, Madrid, Funza and Facatativá in the Sabana Occidente region. In Bogotá the line will connect with the planned metro.

The end-to-end journey time will be about 48 min, and future ridership is estimated at more than 130 000 passengers/day. Vice-Minister of Transport Juan Camilo Ostos Romero said residents would see 'a significant improvement in their quality of life' thanks to the reduction in travel times.

The overall cost of the project is 3.43bn pesos, with the national Government to provide 1.32bn pesos for construction and the Cundinamarca region 0.594bn pesos. The contractor will also raise a proportion of the capital funding.

Egis reviewed studies for the project, working with local legal firm Duran & Osorio and financial consultancies Deloitte and Sumatoria.

Speaking at the contract signing, Governor of Cundinamarca Nicolás García Bustos said contracts would be awarded in February for studies of the Tren del Norte proposal for a line linking Bogotá with Zipaquirá, Cajicá and Chía.

With Battery dominated Hybrid Propulsion convertible Trams enter Service as Msheireb; Downtown Doha Tramway opens; Qatar

14th January 2020 ; Metro Report International



QATAR: A 2.12 km circular tramway in the Msheireb Downtown Doha district of the capital opened at the end of December.

Travel is free. Trams run every 6 min, serving nine stops and a 400 m hop-on/hop-off zone in the Wadi Msheireb area. Interchange to the city's metro network is provided at the Central Msheireb stop.

The three custom-designed 1 435 mm gauge single-section vehicles were supplied by US company TIG/m. They are **powered by a 'battery-dominant' hybrid propulsion system, with two large LiFePO4 traction battery banks and a small LPG-fueled generator set; other generator options are offered by TIG/m including fuel cells.**

The propulsion system is designed to be able to offer 20 h of passenger service per day without needing an external power source and maintaining at least 30% surplus power in order to extend the battery life by avoiding deep-cycles.

The vehicles' air-conditioned interiors have 33 seats, wi-fi and CCTV. The windows incorporate light-filtering glass panels designed to reduce the heat from sunlight by 90%, and the glass can be removed for open-sided operation during the cooler winter months.

Supercapacitor Hybrid Buses from Solaris to reduce Emissions at Stops; Poland

14th January 2020 ; Metro Report International



POLAND: Solaris has won an order to supply Zabkowice Śląskie with seven Urbino 12 buses equipped with **supercapacitor energy storage** and an engine control system designed to reduce emissions at bus stops.

The vehicles will have hybrid drives comprising a 120 kW electric motor powered by a 151 kW diesel engine meeting the Euro 6 standards, with **supercapacitors used to store**

regenerated energy. This is expected to reduce fuel consumption and emissions compared to conventional diesel buses.

The buses will also be fitted with an Arrive & Go function which turns the engine off on the approach to a bus stop and on again when the vehicle departs. Solaris said this would enable a substantial reduction in exhaust and noise emissions in areas where passengers wait.

Facilities on the 12 m long vehicles will include 37 seats, air-conditioning, CCTV, a voice announcement system, USB ports and defibrillators.

The order is being financed by the European Regional Development Fund under the Regional Operational Programme for the Dolnośląskie region in 2014-20.

Tenders are to be called in Q2 2020 for the operation of services totalling 1 500 km per day using the new buses, which are scheduled to be delivered by the end of July.

EBRD Urban Transport Programme finances Poltava Trolleybus Order; Ukraine

13th January 2020; Metro Report International



UKRAINE: Poltava Transport operator Poltavaelectroavtotrans has awarded Bogdan Motors an €8m contract to supply 40 trolleybuses by the end of 2020, financed using the first loan to be finalised under the European Bank for Reconstruction & Development's €250m Ukraine Public Transport Framework II programme.

The EBRD programme aims to address urban congestion, air pollution and transport service quality in Ukrainian cities by supporting the acquisition of new trams, buses, trolleybuses and metro cars and the modernisation of infrastructure including fare

collection, vehicle location and traffic management systems. Technical co-operation will help to establish a more transparent institutional framework for transport operations.

The 12 m long T701.17 low-floor trolleybuses for Poltava will have a total capacity of 105 passengers, including 34 seated, with facilities for passengers with reduced mobility.

A further €2m EBRD loan will cover upgrading of the overhead wires and substations

Abidjan to expand Bus Network and study Cocoa Biofuel; CÔTE D'IVOIRE

27th December 2019; Metro Report International



CÔTE D'IVOIRE: The Ministry of Transport, transport operator SOTRA and Scania have signed an agreement for the supply of 400 low-entry 13 m buses and 50 compressed gas fuelled 18 m articulated buses, which will have with bodies from Marcopolo. The deal includes depot upgrading and training of drivers and technicians.



The order forms part of an initiative backed by Swedish and French companies and institutions which aims to improve public transport to support a predicted increase of the population of Greater Abidjan to 7.7 million by 2030. The target is for two-thirds of residents in 2030 to have access to the city centre within 1 h.

Scania and the Agence Nationale d'Appui au Développement Rural have initiated a feasibility study funded by Swedish development finance institution Swedfund to assess the opportunities for local production of biofuels from agricultural waste from cocoa, rubber and banana cultivation.

'Côte d'Ivoire has demonstrated an impressive economic growth these latest years and has now started investing in a stronger infrastructure for continued growth', said Anthonia Adenaya Huard, Regional Director for West Africa at Business Sweden, when the deal was announced on December 11. 'This is evidence of the higher investment activity I see in the whole region of West Africa with an increased attention from Swedish companies.'

Abidjan Metro Package approved; CÔTE D'IVOIRE

23th December 2019; ; Metro Report International

CÔTE D'IVOIRE: The government has formally approved the technical and funding proposals for construction of an elevated metro line in Abidjan, which is to be developed by a consortium of French companies.

A line from Anyama in the north via the city centre to Port-Bouët in the southeast (37.9 km, 20 stations) is under construction for expected to open in 2020. The standard gauge elevated route will mostly parallel Sitarail's metre-gauge main line from Ouagadougou, with a short extension south to Félix .

CNG Buses delivered to Abidjan; CÔTE D'IVOIRE

18th December 2018; ; Metro Report International

CÔTE D'IVOIRE: Iveco Bus officially handed over 26 compressed natural gas buses to Abidjan transport operator SOTRA on December 13th, at a ceremony attended by Prime Minister Amadou Gon Coulibaly and Transport Minister Amadou Koné.

First Phase of Sydney Light Rail Transit with Alstom APS Ground-Level Power Supply inaugurated; Australia

Railway Gazette International, January 2020



The first phase of the CBD & South East light rail route in Sydney was inaugurated on December 14, with a weekend of free travel. The 7.3 km north-south L2 Randwick Line serves 14 stops between Circular Quay and Randwick. A second southern branch from Moore Park to Kingsford is still to open; this would add five stops and 4.7 km. The 2 km section from Circular Quay to Town Hall is equipped with Alstom's APS ground-level power supply to enable catenary-free operation. A pair of Alstom Citadis X05 LRVs stand at Town Hall tram stop on December 5 during the final stages of testing.

METRO NEWSLETTERS **on Technologies for** **“URBAN MOBILITY AS A SERVICE”**

**PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND
REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN
MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT,
LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN,
COMMUTER-RAIL, MONORAIL, AERIAL ROPEWAY, BOTTOM
CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE
MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD
CARS, SUSPENDED MONORAIL METRINOS**

**TRANSPORT TECHNOLOGIES AND ECONOMIC DEVELOPMENTS IN
MODERN URBAN/MEGAPOLIS ENVIROMENT**



Artist`s Concept of “NEXT GENERATION TRAM/LRV” by Stadler

METRO Newsletter by Dr. F.A. Wingler

METRO 97, February 2020



Light Rail Transit TRIMET; Portland, Oregon, USA

Synopsis:

Even as the country has close to 650 km of operational Metro lines and hundreds of kilometre under construction, **most Metro networks in India are facing heavy losses: “Metro Rail across India run into Losses!”**

The newsletter covers more details of the more **COST EFFECTIVE SUPPLEMENTS FOR METRO RAIL: “METROLITE”, “METRO-ON-TYRES”** and **“METRO NEO”**. The technologies will be borrowed from abroad (from **“other countries”**).

I regard **optical guided and rubber tyred trackless city trams** with steering axles (Castellon de la Plana, Spain and Zhuzhou, China) as not feasible for India under its conditions. Conventional steel rail electric propulsed Light Rail Transits (“Metrolite”) and innovative electric bus systems (“Metro-on-Tyre”, “Metro Neo”) are more advisable for the envisaged cost effective **“METRO RAIL SUPPLEMENTS”**.

Transit-Oriented Development (TOD) strategy and e-Mobility are on the agenda.

Associate Professor-Marketing Dr. Surabhi Singh deals in her essay with **Urban Mobility in India, Challenges and Solutions**.

Semi-High Speed Regional Rapid Transit System, RRTS, Corridors will connect India’s National Capital Region around Delhi.

I notice, that sometimes authors in India copy from each other faulty news, and the fake news becomes by the time reality, so also in case of electric Feeding and Traction Systems for Metro Rail and LRT:

Feeding or supply of electric propelled rail vehicles with electricity and
Traction/propulsion by electric traction motors
are two different things.

Electric Feeding/Supply and Traction/Propulsion by the Traction Motors should not be put in one basket or lumped together in one current and voltage category. In single phase 25 KV, 50 Hz, AC, feeding, the traction motors work nowadays mostly with three-phase AC asynchronous current supplied by **Insulated Gate Bipolar Transistor, IGBT**, power-converter technology on-board of the electric vehicle. The three-phase current for the asynchronous traction motor in any frequency for stepless speed control is generated via on-board transformer and IGBT converter.

Three phase asynchronous alternating current (AC) for traction can nowadays be generated onboard from 750/1000 V DC feeding and as well from 25 kV, 50 Hz, single phase AC catenary supply.

Innovative traction/propulsion technology for Metro Rail and LRT with electric permanent magnet and gearless direct drive motors is coming from China.

Headlines of newsletter **METRO 97** are:

I. Indian Activities and Initiatives

- Metro Rail across India run into Losses.
- Transit-Oriented Development, TOD, as a solution for last-Mile Connectivity Concerns.
- E-Mobility in public Transport; India.
- Indian Scenario for Selection and Adoption of Electric Feeding/Supply Systems for Metro Rail.
- Indian Scenario for Selection and Adoption of Electric Feeding/Supply Systems for Metro Rail.
- “METROLITE” in India.
- Indian Metros in Operation cum Logos – Picture Gallery.
- First Tender floated for supply of 22 Nos. Standard Gauge ‘Metrolite’ Trains for Delhi Kirti Nagar-Bamnoli Village Metrolite Project.
- “METRO NEO” for Nashik.
- Urban Mobility in India: Challenges and Solutions.
- Regional Rapid Transit System, RRTS, Corridors connecting India’s National Capital Region: RRTS, with the Capacity to move 70,000-80,000 Passengers per Hour per Direction, with minimal Footprint on the Land, will act as the Transport backbone of the NCR.
- Ananadnagar-Garware College Section of Pune Metro likely to start by June 2020.

II. Global Activities and Initiatives:

- Guided Bus Replacement by Tram Network in Caen; France.
- Guided Light Transit – GLT (Transport sur Voie Réservée - TVR) in Castellón de la Plana; Spain.
- 250 kmph ‘High Speed Metro’ in Guangzhou Urban Rail Plan; China.
- Cubic and Moovit announce Mobility-as-a-Service Co-Operation; UK.

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Metro Rail across India run into Losses; India

Metro Rail News India, January 2020; see also hinustantimes, ND, Saturday 18th Jan. 2020; e-paper

Even as the country has close to 650 km of operational Metro lines and hundreds of kilometre under construction, most Metro networks are facing heavy losses. According to a recent study which looked at the latest available annual filings for FY18-19, Bengaluru, Chennai, Hyderabad, Gurgaon and Kochi Metros faced losses, with Chennai Metro alone facing net losses amounting to Rs. 714 crore on its total income of Rs. 183 crore, including on operations and other income.

Bengaluru, which is looking to expand its Metro network to 300 km by 2025, earned a revenue of Rs 536 crore, but faced net losses amounting to Rs. 498 crore, as per their annual report. Mumbai, which has only one operational line (11.5 km line connecting the suburbs of Versova and Ghatkopar) also faced a net loss of Rs. 236 crore on revenue of Rs 322 crore, as per their latest annual filings.

However, for Bengaluru and Chennai, while the revenue figures correspond to the operational line, the cost figures correspond to all lines, even those under construction.



Chennai Metro

Urban transport experts pointed out several reasons for the failure. These include lower than expected ridership due to poor last-mile connectivity, delay in commissioning of under-construction lines which would feed ridership to the already operational lines, suboptimal monetisation of non-fare revenue options such as commercial space leasing, advertisement space leasing, property development, land monetisation, etc. due to various constraints, including regulatory and contractual restrictions.

“Unrestricted monetisation of commercial revenue streams is key to the operating viability of any Metro network. It keeps fares under check and reduces the dependency on government funding,” said Shadab Siddiqui, project manager at Auctus Advisors management consultants, which undertook the study as part of its non-fare revenue maximisation project for the Mumbai Metro Rail Corporation (MMRC), which is executing the 33.5-km underground Metro in Mumbai. As per their study, Bengaluru Metro lost a major chunk of non-fare revenue as the city municipal corporation banned outdoor advertising in 2018 owing to the menace of illegal hoardings. The corporation is currently drafting a revised policy which is yet to be finalised. In Chennai and Hyderabad, only a small stretch of the Metro line is operational, leading to restricted ridership vis-a-vis potential and in case of Gurgaon, although there were plans for property monetisation under a transit-oriented development.

Recent policy, it is yet to take off, which along with restricted advertisement rights, made the Metro network unsustainable for the erstwhile private operator. The data for the study was compiled through annual reports and filings with the ministry of corporate affairs. The study benchmarks Indian Metros with international networks like Hong Kong Metro which reported an operating profit of 36% from its Hong Kong operations in 2018 translating to approx. USD 1.5 billion to its coffers, thanks to its monetisation from station commercial and property rentals, as per their 2018 annual report.

According to the study, Delhi Metro, which boasts of a 389 km network, earned revenue of Rs 6,462 crore, with a net loss of only 7% as a large part of their network is operational and the costs correspond to revenue across all lines. Delhi, which has the largest and busiest Metro network in India, earned Rs. 3,119 crore from fares, Rs. 564 crore as its non-fare revenue component, Rs. 2,011 crore via consultancy for other Metro networks and Rs. 767 crore from other income. Delhi's expanded network itself has given a boost to its non-fare revenue via station name rights, advertisement in stations and monetising of commercial space and land parcels.

R. Ramana, executive director at MMRC said, “Metro is an intra-city network, which unless well-connected, will not yield the right benefits. In some cities, the peak ridership is low in comparison to the projected traffic. There are other limitations too. Like fares are not decided as per the prevailing market conditions. It is also not revised regularly.”

Amruta Ponkshe, a Mumbai-based transport expert, said that apart from looking at maximising on non-fare revenue, transit decisions must look to discourage cars too. She said, “Transit decisions made at the metropolitan or national level must look at introduction of congestion charges and increasing parking costs to increase ridership and fare-box revenues.

Transit-Oriented Development, TOD, as a solution for last-Mile Connectivity Concerns; India



Source- The Indian government website

Public Transport is one of the most essential Components of economic Growth as it is directly linked to the Emancipation of People, irrespective of their Income Group.

Poor last-mile connectivity has plagued Bengaluru City for years. As the planners propose a **Transit-Oriented Development (TOD)** strategy, here's a look at how the last mile gaps have constantly affected the growth of public transport. An upgraded, swift and reliable public transport system has been the need of the hour as the city continues to expand and grow, drawing masses from across the country. Public transport is one of the most essential components of economic growth as it is directly linked to the emancipation of people, irrespective of their income group.

For a skill-rich city like Bengaluru, infamous for its traffic situation, a comprehensive mobility plan could potentially boost the efficiency of the privileged, but it can also enable the not-so-privileged to overcome social exclusion and access jobs and services. However, in reality, for the working poor in the city, commuting is still an exorbitant affair, and last-mile connectivity remains a clog in the wheels.

As she waits at the bus stop on M G Road, Varsha, a college student in her early twenties is visibly impatient. "The buses are usually delayed by 15-20 minutes, and the frequency is also low." Varsha lives in Hoskote and the everyday commute to her college is hampered by the tardy and infrequent bus system from her place. The auto rickshaws refuse to ferry according to the fares set by the Regional Transport Authority. Most drivers demand a minimum of Rs 50, or an additional Rs 20 over the meter fare. The fares are doubled or tripled at night, making the commute extremely expensive.

Akhil, a senior executive who works for an MNC commutes from Bellandur to Koramangala says, “I end up spending more on the auto fare than the bus fare just for my last mile, i.e., from the bus-stop to my house.

The opulent comfort of private cabs is limited only to the middle and higher classes, which form less than a third of the city’s population. There is a gap in demand and supply in the private cab services too as the average wait time for the cabs is around 10-15 minutes.

Higher refusal rates happen to be another inconvenience. Siddhant Pratap, a computer engineer who lives in Marathahalli and travels to HSR Layout for his work says, “I chose to invest in a two-wheeler instead of taking public transport. Since there is no Metro in my route, taking a bus is the only available option.” “I can’t afford to be late to work in the morning. Therefore relying on buses, which tends to take more time owing to traffic and delays, is not my first preference. Lane discipline and poor traffic sense amongst people defeats the whole point of bus priority lanes, especially during the peak hours,” Siddhant elaborates. almost a kilometre away. Walking that stretch while going to work or a social commitment would mean inhaling a whole lot of dust and ending up grimy and sweat-stained when I reach my destination.” On the rare occasions when she takes a bus, “crossing the Outer Ring Road to reach the bus stop is a matter of life and death as there are no red signals, or an overbridge, or a zebra-crossing, and the vehicles do not slow down for pedestrians.

” This is what Sanjana J Satish, who works for a law firm, has to say: “I usually take the Shivajinagar bus (13, 13A/B/C etc) or the Metro to MG road or Indiranagar. My major issue is overcrowding of buses and Metros to a point where you can’t move and sometimes can’t even breathe properly.” She feels the government needs to increase the frequency of buses on certain routes. “Besides, the Green Line often runs only three coach trains, which leads to overcrowding.”

E-Mobility in public Transport; India

Metro Rail News India, January 2020



E- Mobility; Image by The Economic Times, India

One of the key factors for achieving climate protection targets is having a strong public transport system. As well as generally expanding public transport, it is of crucial importance to switch to emission-free modes of transport such as in bus fleets. In its Clean

Vehicles Directive, the EU therefore requires public authorities to purchase a minimum quota of clean buses. This means that, as of 2021, at least 45 percent of buses must use alternative drives or run on natural gas or synthetic fuels. This quota will be increased to 65 percent as of 2026.

Using buses with electric drives rather than conventional combustion engines would reduce noise pollution as well as cutting down substantially on emissions that are harmful for the climate and human health. As Martin Schmitz, Technical Director of the Association of German Transport Companies (VDV), which has more than 600 member companies from the public passenger and rail freight transport sector, explains: "Around 315 electric buses are currently being used in Germany, with a further 750 on order. However, the difficulties involved in supplying power to depots and getting approval for building charging infrastructure in densely built-up urban areas are continuing to hamper the switch to e-mobility. After all, as well as the vehicles themselves, it is primarily a question of infrastructure and new operational processes.

Range Calculation takes into Account Weather Conditions, Traffic Jams and Route Characteristics: Swiss company Trapeze is showcasing special solutions for e-bus fleets at IT- TRANS. The Trapeze Smart Monitor allows the vehicle status to be monitored. The system provides real-time information on all the available vehicle data such as battery charge level and possible range in hours or kilometre. The technical status of the vehicle is also recorded automatically and communicated to control room and workshop. The ongoing range calculation additionally takes into account factors influencing energy consumption such as weather conditions, uphill and downhill sections and repeated stopping and starting on account of traffic jams and diversions. In this way, the smart software solution simplifies operational processes, making it possible to plan vehicle deployment more efficiently, to exclude range risks and also to reduce operating costs by optimizing workshop processes and maintenance.

New at IT-TRANS: Control centre simulates e-bus route planning The Future Mobility Lab is a new feature at IT-TRANS 2020. Among other things, a control room will be set up to simulate how electric and autonomous vehicles are integrated into a transport system that also features vehicles with drivers. The control centre will be set up by the Swiss exhibitors Trapeze. The software for the integrating the self-driving vehicles in the control system is being supplied by its subsidiary AmoTech. "We will be using the control centre to show you the challenges involved in managing a complex transport system. If vehicles with drivers are en route at the same time as self-driving vehicles it is important, for example, to decide – with Swiss company Trapeze is showcasing special solutions for e-bus fleets at IT- TRANS. The Trapeze Smart Monitor allows the vehicle status to be monitored. The system provides real-time information on all the available vehicle data such as battery charge level and possible range in hours or kilometres. The technical status of the vehicle is also recorded automatically and communicated to control room and workshop. The ongoing range calculation additionally takes into account factors influencing energy consumption such as weather conditions, uphill and downhill sections and repeated stopping and starting on account of traffic jams and diversions. In this way, the smart software solution simplifies operational processes, making it possible to plan vehicle deployment more efficiently, to exclude range risks and also to reduce operating costs by optimizing workshop processes and maintenance.

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exhibitors Trapeze. The software for the integrating the self-driving vehicles in the control system is being supplied by its subsidiary AmoTech. “We will be using the control centre to show you the challenges involved in managing a complex transport system. If vehicles with drivers are en route at the same time as self-driving vehicles it is important, for example, to decide – within its operating area. The Berl König project won the 2019 Public and Urban Transport Strategy Award sponsored by the International Association of Public Transport (UITP). UITP is a co-organizer of ITTRANS.



IVU.suite combines all Vehicles in one Interface: The IVU.suite enables operational factors such as charge management and charging times, ranges, route lengths, overnight and opportunity charging to be optimized, and electric buses to be seamlessly integrated in planning, scheduling and control. IVU.rail, the integrated standard system for railways, helps to make efficient use of rolling stock. The vehicle and maintenance optimization system automatically takes into account predetermined service intervals and planned maintenance. In the event of a fault, a suggestion function recommends a suitable replacement vehicles and routes. IVU.rail also optimizes personnel deployment. The IVU.crew planning solution provides support in all personnel deployments and ensures that employees are where they are needed.

Coverage Monitoring Facilitates efficient Use of Resources:

Verkehrsautomatisierung Berlin GmbH (VAB) also supports intelligent and demand-driven planning for e-bus fleets with IT solutions. The objectives are fast handling capabilities in daily operations and a reduction in administrative effort. Electromobility influences numerous operational processes at the depot and in the route network. VAB's smart charging management solution in combination with range monitoring ensures eco-friendly and efficient use of resources. Proven technologies can be seamlessly integrated for reconditioning vehicles, for example in the form of demand-led control of vehicle preheating.

Practical optimization software for electric buses Mentz, a Munich based company, is showcasing its GENIOS family at IT- TRANS for the first time. The program core integrates the latest research results from the fields of artificial intelligence, evolutionary algorithms and graph theory. The GENIOS family currently includes optimizations for electric buses, integrated and sequential duty and vehicle scheduling, duty rosters, personal duty scheduling, route planning to supply stops with printed timetables, and connection planning. Parameters such as legal requirements and operational agreements can be set or even redefined by the user on the application's interface. Similarly,

performance indicators to monitor optimization processes and solution proposals can be created through modular design.

Data-based Decisions for Information and Cost Transparency: Pure Vision Systems is consistently focusing on big data throughout its line of products and services, thus keeping public transport future proof and competitive. Typical applications include continuous recording of vehicle positions and meta data, information on fuel consumption and routes driven (relevant for e-mobility applications) and the creation of the basis for differentiated controlling. Data from all the on-board vehicle systems such as IBIS, passenger counting systems and vehicle CAN are recorded synchronously on the central system platform processed and forwarded to backend systems. Depending on intended data usage, the data is processed either in real time or transferred to backend systems using block transfer.

DISCLAIMER

The published articles reflect the personal opinions of the authors (in this case the exhibitors at IT-TRANS) and do not represent the views of the International Association of Public Transport (UITP) or Messe Karlsruhe. Minor changes have been made to the texts supplied by the exhibitors.

Indian Scenario for Selection and Adoption of Electric Feeding/Supply Systems for Metro Rail; India

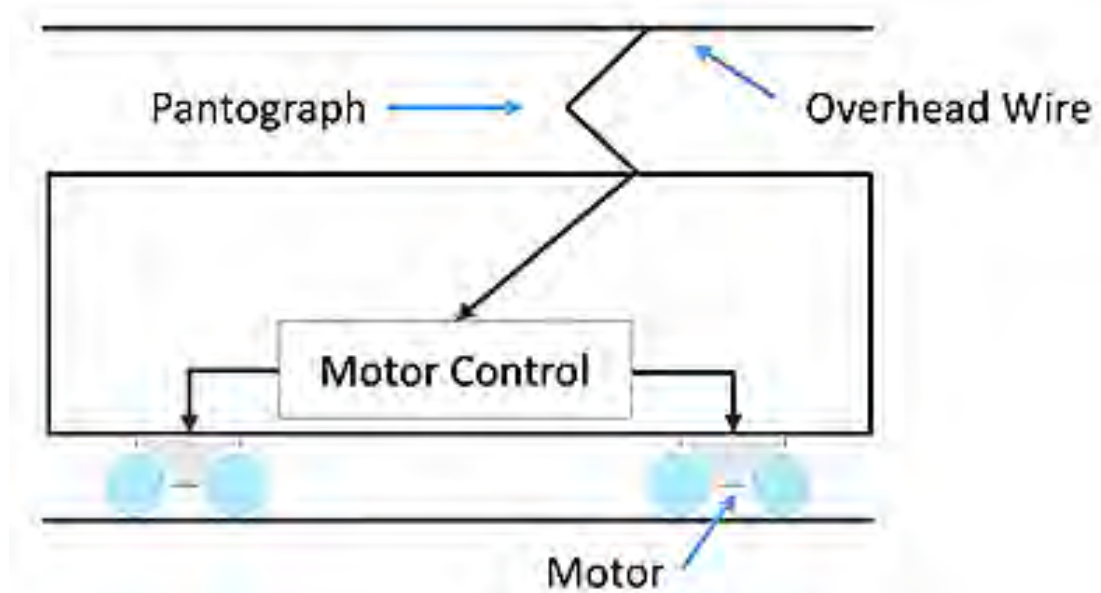
Excerpts from Metro Rail News India, January 2020; revised by F.A. Wingler

HISTORICAL DEVELOPMENTS – INDIA: First electrification in India – 1500V DC Traction in Mumbai Suburban Section of Central Railway in Mumbai-Kurla section in 1925. Indian Railways adopted:

- 3000 V DC in Howrah-Burdwan section in 1954.
- 25 KV, 50 Hz AC for large scale electrification in 1957.
- Converted Howrah-Burdwan from 3000 V DC to 25 KV, 50 Hz, AC in 1968.
- Converted Mumbai suburban section to 25 KV, 50 Hz AC – 2015.

25 KV, 50 Hz, AC SINGLE PHASE CATENARY FEEDING:

- Delhi Metro (DMRC) (Aiming to maintain interchange with IR).
- Mumbai.
- Chennai.
- Jaipur.
- Lucknow Metro.
- Hyderabad Metro.
- Nagpur Metro.
- Noida Metro.
- Pune Metro.

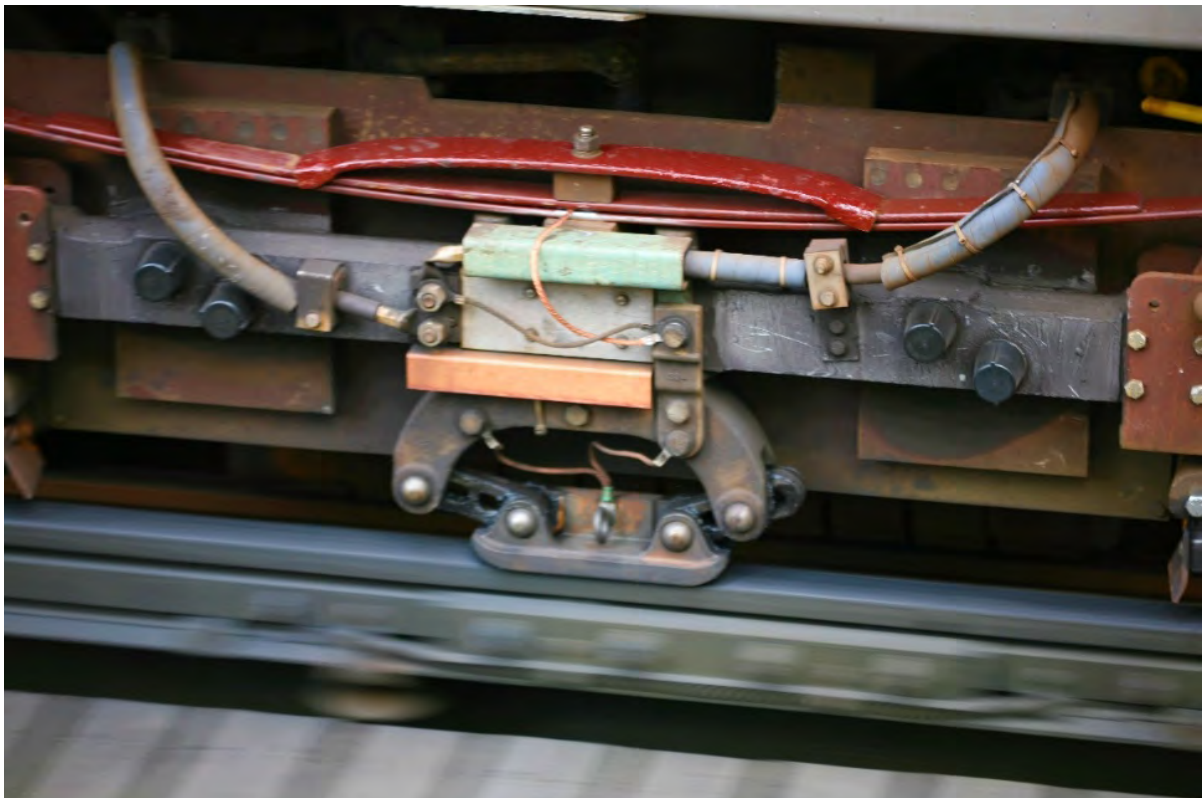


Single Phase Overhead Catenary Feeding with Pantograph

750 V DC THIRD RAIL FEEDING:

- Kolkata Metro (by Indian Railways).
- Kochi **.
- Ahmedabad Metro**.
- Bangalore Metro.
- Rapid Metro Gurgaon.

**Kochi and Ahmedabad initially planned with 25 KV, 50 Hz, A C, subsequently switched over to 750 V DC third rail (to suit local conditions).



Third Rail Electric 750 V DC Feeding with Contact Shoe

Delhi Metro adopted 25 KV, 50 Hz AC Feeding System in Shahdara line for providing connectivity at Shahdara. Continued with it in other sections for uniformity, familiarity, greater indigenous knowledge and also high PHPDT in most of its lines.

Chennai Metro adopted 25 KV, 50 Hz AC Feeding System right from inception due to expected heavy ridership.

Bangalore Metro: Being the garden city of India is very cautious of its aesthetics; adopted 750 V DC Feeding System right from inception.

Kochi Metro: Kochi being coastal city preferred 750 V DC Feeding System due to frequent gales and storms plus lower PHPDT.

Ahmedabad Metro: Ahmedabad is famous for kite flying and wanted to avoid danger to kite flyers plus lower PHPDT and hence adopted 750 V DC.

Jaipur Metro: With 25 KV, 50 Hz, AC. “Kite flying is very dangerous near Jaipur Metro Rail Routes”.



Kite Flying, popular in Jaipur, has become extremely dangerous near Metro Rail Routes

Lucknow Metro adopted 25 KV , 50 Hz AC due to association with DMRC.

Mumbai Metro: This Metro has been constructed on a PPP basis. Concessionaire Reliance Infra decided to adopt 25 KV, 50 Hz, AC Feeding.

Navi Mumbai Metro: This Metro is being constructed by CIDCO and has decided to adopt 25 KV AC.

Hyderabad Metro: This Metro is being constructed on a PPP basis. Concessionaire L & T has decided to adopt 25 KV, 50 Hz, AC.

Nagpur Metro adopted 25 KV, 50 Hz, AC on the consideration of uniformity with other Metros in the state of Maharashtra – Mumbai Metro -1, Mumbai Metro -3, Navi Mumbai Metro, which have already adopted 25 KV, 50 Hz, AC.

THE DEBATES AND DELIBERATIONS CONTINUE

Different countries and even different cities in the same country continue to follow different Feeding systems for Metros. In the above background, MOUD formed a committee for “Standardization and Indigenization of Metro Rail Systems” in May 2012. The committee finalized its recommendations in March 2013, and the recommendations on electric feeding indicate broad guidelines and left the final decision to individual Metro Authorities. Both systems have their pros and cons, and further detailed study is required for adoption in Indian Metros. Thus the quest for standardisation in this regard is still on.

SUMMARY OF MAIN RECOMMENDATIONS OF COMMITTEE FORMED BY MOUD

- Metros in India may consider adoption of 25 KV, 50 Hz, AC or 750 V DC keeping in view level of ridership – heavy, medium, light.
- Route in the City - elevated or underground.
- Local Conditions – climatic, geographic etc.
- Aesthetics and Environmental Conditions peculiar to the area of the city.
- Economic Viability based on capital and maintenance costs.

Comments by the Author F.A. Wingler:

Electric Feeding/Supply and Traction/Propulsion by the Traction Motors should not be put in one basket or lumped together in one current and voltage category. In single phase 25 KV, 50 Hz, AC, feeding, the traction motors work nowadays mostly with three-phase AC asynchronous current supplied by Insulated Gate Bipolar Transistor, IGBT, power-converter technology on-board of the electric vehicle. The three-phase current for the asynchronous traction motor in any frequency for stepless speed control is generated via the IGBT converter.

If to adopt 750 V DC or 25 000 V AC, this is also a question of the energy loss in the length of the system and if later an interoperable traffic switching from Metro Line to RRTS or IR Lines is envisaged.

Hyundai Rotem, South Korea, introduced new permanent Magnet synchronous Traction/Propulsion Motor for Rail Vehicles, PMSM. The Company plans to aggressively target the domestic and overseas electric Rail Vehicle (Metro, LRT, Locomotives) Market with its PMSM Propulsion Technology; see International Railway Journal Pro, Sep. 20th, 2019, written by David Burroughs; see also F.A. Wingler in ***THE WORLD OF TRANSPORT TECHNOLOGIES; INDIAN AND GLOBAL ACTIVITIES FOR URBAN MOBILITY – METRO-NEWSLETTERS***, Portfolio **METRO 7** - Newsletter 88, published on: [December 23th, 2019](#), by [Chaminda Weerawarna](#) Category: [Metropolitan Transport Schemes](#), [Rail Track Engineering](#) on <http://www.drwingler.com> .

“METROLITE”/Light Rail Transit and “METRO NEO” to use in Mass Rapid Transit (MRT); India

Editorial by Manager Narendra Shah, Metro Rail News, India, January 2020



Light Rail Transit TRIMET; Portland, Oregon, USA

A Light Rail based Transit, LRT, makes more sense for Indian cities, particularly the non-metro ones. Delhi's much-lauded metro rail system sparked a frenzied rush in other cities to build similar metros. Hopefully, with the national capital getting ready to build a light-rail based transit system. The Union Ministry of Housing and Urban Affairs approved two such corridor of Delhi Metro Rail Corporation, and recently other cities will now start paying more attention to the hitherto ignored light rail transit options. The light rail trains in both Delhi and Nashik are expected to run on rubber tyres at street level. These are welcome developments to provide rapid and affordable transit options to masses.

“METROLITE” in India

Metro Rail News India, January 2020

Metrolite will act as a feeder system to high capacity Metro as well. In addition to less capital cost, operation and maintenance cost of Metrolite would also be less making it more viable.

Metrolite is suitable for cities with a maximum 15,000 passengers per hour per direction which suit most of the small cities. It is to be noted that the metro rail system currently being developed is of high capacity which is required for bigger cities with very high ridership and Peak Hour Peak Direction Traffic (PHPDT). Seeing the success of metro rail

in the country, several smaller cities with a lower projection of ridership are aspiring for a rail-based mass rapid transit system. To fulfil this need, "Metrolite" with lesser capacity and much less cost is planned by the government. State governments have already been requested to adopt Metrolite as a prime mode of mass transit in smaller cities. The cost of construction for Metrolite is much less than (about 50% of elevated and 20% of underground) of a high capacity metro system.

What is Light Rail Transit?

Light rail transit (LRT), tram or fast tram is a form of urban rail transit, which uses rolling stock similar to a tram, but operates at a higher capacity, and often on an exclusive right-of-way. While there is no standard definition, in the United States (where the terminology was coined in 1970s), light rail operates primarily along exclusive right-of-way and uses either individual tramcars or multiple cars/coaches coupled to form a train which runs with lower capacity at lower speed compared to long heavy-rail passenger train or metro train. This type of transit system is referred to as a Light Metro. It is worth mentioning that Light Rail systems are found throughout the world, on all inhabited continents. They have been rather popular in recent years because of their lower capital cost and increased reliability. The Ministry of Housing and Urban Affairs issued that Standards for "METROLITE" earlier this month. This system is most viable and sustainable due to its attractive capital operation and maintenance cost.

Features proposed in METROLITE Trains:

1. **METROLITE** trains with a maximum 12 t axle load is to be adopted for passenger PHPDT capacity from 2,000 to 15,000. The track curves of radius up-to 25 m are adopted. Hence, the car body width of 2.65 m is to be adopted as the standard dimension.
2. The car structure material shall be stainless steel or Aluminium. The train configuration will be of the three-car unit. The number of additional coaches of the train may be decided by the Metrolite authority based on PHPDT in the initial design stage itself.
3. Trains shall be capable of carrying full load passengers up-to a gradient of 6%. Individual metro authorities can decide the gradient requirements based upon the site conditions as Metrolite is predominantly planned at-grade.
4. Up-to-300-passenger loading for 3-coach train unit. The train shall be capable of travelling in elevated, at grade and tunnel sections.
5. Motorisation - Minimum 50% motorized axles for the unit of 3 non-separable coaches. Maximum operational speed is proposed at 60 kmph. Safety certified obstruction detection system shall be employed for the trains. The 'Metrolite' system will have a dedicated path separating it from road traffic. For segregation with road traffic, fencing will be provided on either side of the network. To recall, the Modi government in its manifesto had promised to expand the metro network coverage to as many as 50 cities. This new transit system will be provided with shelter platforms, no platform screen doors, AFC gates, X-ray and baggage scanner. The ticket validators are likely to be installed inside the train and shelter with NCMC or other ticketing systems.

Light Rail Transit System in other Countries:

Several countries in Africa, Asia, Europe, North America and South America have a light rail transit system. Some of the major light rail system include Baltimore light rail with average speed of 24 mph, Dallas (Red Line) at 21 mph, Dallas (Blue Line) at 19 mph, Denver (Alameda-Littleton) at 38 mph, Denver (Downtown-Littleton) at 26 mph, Los Angeles (Blue Line) at 24 mph, Los Angeles (Green Line) at 38 mph and Salt Lake City at 24 mph.

Advantages of "METROLITE"

1. Since the cost of construction for spelling error, 'Metrolite'" is way less compared to metro, the fare is expected to be less as well, which will be a huge advantage for the lower middle class and middle-class population.
2. Several small cities face connectivity issues due to lack of proper public transport. The Meterolite service will offer smart, convenient and cost-effective transit option to people enabling them to commute easily within the state.
3. The government is also planning to ensure that Metrolite acts as a feeder system to high capacity Metro, which means that people who have trouble reaching high capacity metro rail now due to connectivity issues will be relieved as these light metros will make commute simpler.
4. Private vehicle hike on roads has contributed to pollution and traffic congestion. Hundreds of autos are the only source of local transport in some small cities. With the introduction of Meterolite service, it is expected that several private vehicles may be taken off-road which will help lower pollution and decongest roads. Recently Delhi Metro Rail Corporation (DMRC) has submitted detailed project reports for the two proposed Metrolite corridors — Rithala to Narela (21.7 km) and Kirti Nagar to Dwarka ECC (Exhibition-cum-Convention Centre) in Sector 25 (19 km) — to Delhi government for approval. After getting a nod from the Government and the Centre, DMRC expects to complete the two projects within three years. The Rithala-Narela corridor is expected to come up first.

Indian Metros in Operation cum Logos – Picture Gallery; India

By F.A. Wingler

Picture Gallery

Indian Metros in Operation cum Logos - Date of Opening Sequence



1. Kolkata Metro
October 24th, 1984
27.22 km



2. Delhi Metro
December 24th, 2002
347.66 km

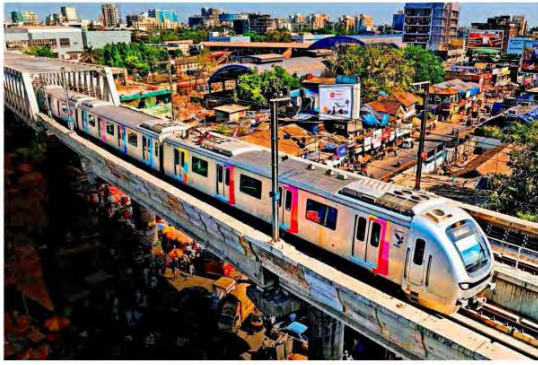


3. Namma Metro Bangalore
October 20th, 2011
42.30 km



4. Rapid Metro Gurgaon
November 14th, 2013
11.70 km





5. Mumbai Metro
June 8th, 2014
11.40 km



6. Jaipur Metro
June 3rd, 2015
9.63 km



7. Chennai Metro
June 29th, 2015
45.10 km



8. Lucknow Metro
September 05th, 2017
23.70 km





9. Kochi Metro
October 03rd, 2017
27.80 km



10. Hyderabad Metro
November 29th, 2017
56.50 km



11. Noida Metro
January 25th, 2019
29.70 km



12. Nagpur Metro
March 07th, 2019
13.50 km





13. Ahmedabad Metro
March 14th, 2019
6.5 km



14. Pune Metro
sheduled opening June 2020
7 km



First Tender floated for supply of 22 Nos. Standard Gauge 'Metrolite' Trains for Delhi Kirti Nagar-Bamnoli Village Metrolite Project; India

By Urban Transport News - January 5, 2020



Animation for "METROLITE"

New Delhi, India (Urban Transport News): The Delhi Metro Rail Corporation Limited (DMRC) invites online bids on international competitive bidding (ICB) basis from the eligible and experienced Rolling Stock manufacturer for the supply of 22 nos. 3-coach Metrolite Trains (Rolling Stock) for the **Kirti Nagar-Bamnoli Village Metrolite Project**.

Scope of Work

Design, manufacture, supply, testing, commissioning, and comprehensive maintenance up to fifteen years of 22 numbers of standard gauge Metrolite trainsets and complete depot for Kirti Nagar – Bamnoli Village Metrolite project of Delhi MRTS.

Key Information

- Tender Notice No.: MLRS1
- Issue Date: 03.01.2020
- Estimated Tender Value: [Confidential]
- Security Money Deposit: [Confidential]
- Tender Document Cost: INR 23,600.00 inclusive GST.
- Sale of Tender Document: From 24.01.2020 to 22.04.2020
- Last Date for submission of Tenders: 22.04.2020 up to 1500 hrs.
- Date of Opening of Technical Bids: 23.04.2020 at 1505 hrs.
- Pre-Bid Meeting: 26.02.2020 at 1100 hrs.

About Kirti Nagar-Bamnoli Village Metrolite Project

The 19.09 km long Kirti Nagar-Bamnoli Village Metrolite corridor will start from Kirti Nagar interchange metro station (connecting the Blue and Green Lines) and end with Dwarka Sector 25 (will extend from Dwarka Sector 21) to connect the Airport Express Line.

This corridor will have a total of 21 stations, out of which 16 stations will be at-grade, while five will be elevated. This will make approximately 11.8 km long distance of the corridor to be at grade, while 6.6 km long to be elevated. The corridor will pass through densely populated areas such as Mayapuri, Dabri, Bamnoli and Dhul Siras in the capital.

In October 2019, the central government has approved the Kirti Nagar-Bamnoli Village Metrolite project as proposed by the Delhi Metro Rail Corporation (DMRC).

“METRO NEO” for Nashik; India

Metro Rail News India, January 2020



The Greater Nashik Metro or Metro NEO is a proposed rapid transit system in the Nashik metropolitan area. The system is proposed to reduce traffic congestion as well as provide direct connectivity to Nashik city from its Suburbs. The Greater Nashik Metro will connect suburbs of Nashik city like Deolali, Nashik Road, Upnagar, Nashik Airport, Sinnar, Igatpuri, Gangapur, Traimbakeshwar, Dindori, Bhagur, Niphad, Adagaon, Ghoti and Girnare. This project is implemented and operated by Maharashtra Metro Rail Corporation Limited with the help of Central and state government, Nashik Metropolitan Regional Development Authority (NMRDA) and Nashik Municipal Corporation. It will be India's first Rubber-tyred metro. Greater Nashik Metro will be implemented by MahaMetro and funded by CIDCO.

Proposed Standard Specifications for Metro Neo, Summary:

- Elevated or At-grade shared Right of Way (RoW);
- Rubber-tyred bi-articulated electric coaches – quality at par with Metro;
- Overhead traction of 750 VDC • Coaches are capable of running on battery in Non-OHE zones;
- Guided coaches for passenger safety and also upgradable to LRT;
- Small stations – Entry from footpath to platform through lift/link bridge;
- Higher acceleration and deceleration;
- Coaches can run very close to each other thus attaining lesser headway;
- Telecom network to connect coaches, provide ticketing and smart passenger information system;
- Superior in terms of vibration, noise, acceleration and cost;

Civil Parameters for elevated Metro Neo:

- Width of viaduct = 8 m.
- Shared right of way can be planned for 8m of viaduct.
- Road space occupied for piers is max 2.2 m.
- No Concourse level in elevated stations, All technical rooms and TOM planned on Platform level only.
- Platform width for elevated station is 2.25 m on either side, length of platform is minimum 30 m.
- Foot over bridges and elevators are planned for entry/exits..
- Turnarounds are provided at terminals of the corridor.
- Vertical gradient for viaduct = 5%.
- Desirable horizontal turning radius = 90m Civil Parameters For At-grade Metro Neo.
- Shared RoW for Metro Neo. If dedicated RoW is to be provided then continuous fencing/plinth is provided.
- Width occupied 8 m (RoW) on the roads (for UP+DN line) and 1 2m at the stations.
- If road width is not available, single line (4 m) shall run on one road and other line is planned on parallel road.
- Width of each platform = 2.25 m, length of platform is min 30 m.
- Station roof shall be optimized upto the platform area, not entire road width.
- Ring network to be planned to reduce the head way. • Crash barriers are provided for collision prevention.

Rolling Stock

- Rubber tyred electric coaches with axle load 10-12 t
- Coach width = 2.55 m.
- 2 types of coaches single articulated with 18 m length and double articulated with 25 m length.
- 18 m coaches will have a passenger capacity = 140, and 25 m coaches have 250.
- Car structure shall be stainless steel or Aluminum.
- Sufficient Battery capacity upto 20-25 km at non-OHE zones.

- Max. operating speed = 65 kmph; average speed = 30 kmph
- Front or Back or Side evacuation can be possible as per Metro authority.
- Anti-collision devices in coaches to prevent forward collision and over-speed warnings.

Power Supply for Traction:

- Operate on 750 VDC overhead power supply/feeding (parallel overhead wires) .
- Dedicated HT supply (22/33 kV) will be availed from grid substation thereby avoiding the requirement of Receiving Substation (RSS).
- Ring Main Network - The power supply at 22/33 kV voltage level will be distributed along the alignment through 33 kV ring main cable network for feeding Traction Substations (TSS).
- These cables will be laid in dedicated ducts along/below the viaduct.
- A Supply substation (SSS) for every 2-3 km will be envisaged.
- The contact wire shall be hard-drawn copper or copper alloy wire, usually with a cross section ranges from 80/100/107/120/150 mm².
- Height used for standard contact lines - 5.5 m and for lines under bridges or for depots - 4,5 m up to 5,5 m.
- Catenary switches are provided on OHE wires for route diversions Signal, Telecom and AFC.
- Line of sight Signalling dependent on driver with anti-collision devices and speed limits.
- Central monitoring system of coaches in control centre with GPS based technology.
- Fibre optic cables, minimum CCV surveillance in stations, intelligent display system for coach arrival departure. Centralized storage is given and telecom racks can be placed below platforms avoiding separate telecom room.
- Ticket validators are installed inside coaches with NCMC ticketing systems.
- Tickets are available at stations, TVM's in local shops and other landmark areas in city.
- No AFC gates in stations.

Guidance System:

- Kerb guidance can be used in Metro Neo.
- Small guide wheels are attached to the bus-axle and are guided by vertical curves on either side of the lane.
- These guide-wheels push the steering mechanism of the bus to keep it on centralized path. The bus can be steered in normal way if it is away from the guide way.
- This system permits high speed operation and precise positioning.
- This type of guidance is relatively inexpensive as compared to other systems.

Depots:

- Entry/Exit shall be toll plaza type with inlet points.
- The maintenance and stabling or more facilities for coaches can be done in one depot.
- Depot to be planned without OHE except for OHE maintenance shed & Coaches are to be operated on battery at depots.



Urban Mobility in India: Challenges and Solutions; India

By Dr. Surabhi Singh - January 14, 2020; Urban Transport News, India



Urban Mobility is an indicator of modern cities and shows distinct sustainable development. As per McKinsey, 50% percent of the world's population lives in the towns in 2019. The urban cities, therefore, face common challenges and opportunities. It's helpful to think of urban mobility in terms of people, infrastructure and sustainability. The towns with urban mobility are distinct in policies, technology, consumer preferences, and business-model innovations.

The current developments in the urban mobility industry have opportunities as well as challenges. The smart cities program undertaken by the Indian Government in 2015 is to develop 100 smart cities. Around 11% of work is over and there are challenges involved in the sustainable development programs. Congestion is quite unbearable in many cities and costs some percentage of national GDP, by measures such as lost time, wasted fuel, and increased the cost of doing business. The strategies, which must be employed to meet the challenges, are designing secure public transport systems integrated with MaaS and other platforms, promoting alignment to air quality standards and other quality-of life measures, enhancing public-private partnerships, collaborating with knowledge institutions to address air quality, traffic congestion, and sustainability issues.

Urban mobility projects are highly complex and involve all levels of government, namely local, state and federal). This complexity is most evident in metropolitan regions. Urban mobility projects also affect the use of urban areas and the residents of these areas. Delhi has made metro rail cards usable on buses. The growth of smartcards and app-based services has made the digital currency more acceptable. On platforms, over a third of cab and auto-rickshaw rides are paid for using digital wallets.

Kolkata has shown digitalisation in its transport sector through app-based parking, bringing the use of public transport to over 70%. San Francisco plans to extend the Caltrain to reach the centre of the city, introduces the bus rapid transit along select corridors. Washington, DC, is in the process of expansion of its metro system into the suburbs and is installing dedicated bus lanes.

Helsinki has good public transit is in progress to develop an ambitious on-demand mobility program that aims to make personal cars unnecessary by 2025. The innovative solutions provided for Urban Mobility will give momentum to the growth of any country. India is on the way to achieve urban and public transport goals. Urban-policy decisions made today will determine how mobility and car usage evolve in the next 10 to 20 years.

This article first appears in Urban Transport Infrastructure Magazine, January 2020 Edition (Vol. II, Issue 7, Page 53).

Dr. Surabhi Singh



<https://www.urbantransportnews.com>

Dr. Surabhi Singh is Ph.D. from AMU, ADIM, PGDBA-Mktg., MCA and MCOM & Certification in Marketing Analytics from University of Virginia, USA. With an experience of more than 17 years in academics, research, teaching, training & consultancy, she is currently associated with IMS Ghaziabad as Associate Professor-Marketing. She is member of Editorial Advisory Board of Urban Transport Infrastructure Magazine.

Regional Rapid Transit System, RRTS, Corridors connecting India's National Capital Region; India

RRTS, with the Capacity to move 70,000-80,000 Passengers per Hour per Direction, with minimal Footprint on the Land, will act as the Transport backbone of the NCR.

By Vinay Kumar Singh; 16/01/2020, Metro Rail News



Artist Concept for NCRTC Semi-High Speed Rolling Stock

Population growth in India has led to cities that are buckling under the weight of demand for services. To avoid the overpopulation, many families are moving outside of the cities, but from there, another problem arises: how do they then move around? [Shri. Vinay Kumar Singh, Managing Director of NCRTC](#), explains how this rapid urbanisation has forced India to rejuvenate its public transport offering to ensure that these people are just as provided for as those within the cities' central business districts.



Delhi National Capital Region

Urbanisation is a global phenomenon, and India is no exception to this population shift, primarily due to the evident disparity in rural-urban opportunities. The growing aspirations of the country's citizens force around 25-30 people to migrate every minute from rural areas to cities in search of better opportunities. The national census in 2011 counted 139 million people as domestic migrants in the country between 2001 and 2011. The future is no less challenging for India, with the national economic survey of 2017-18 predicting that about 40 per cent of India's population will be living in cities by 2030. This is further acknowledged by the United Nations in its World Cities report, which has estimated that urbanisation levels in India are expected to gradually increase from the current 32 per cent to 50 per cent in 2050.

This influx of domestic migrants is predominantly to Indian megacities like New Delhi, Mumbai, Bengaluru and Hyderabad, primarily because they are the sectoral hubs driving the economy's meteoric growth. This trend of domestic migration, particularly in New Delhi, has led to uncontrolled urban sprawl, posing serious challenges for infrastructure, environment and citizens' quality of life, constraining economic growth.

Planned growth of existing economic hubs and the development of new economic epicentres will be critical to sustainable polycentric urban development for realising the prime minister's vision to make India a \$5 trillion economy by 2025.

National Capital Region (NCR)

The National Capital Region (NCR) of India encompasses several districts adjoining New Delhi in the States of Haryana, Uttar Pradesh and Rajasthan, with New Delhi at its centre. NCR is one of the largest urban agglomerations in the world, formed in 1985 in line with the internationally adopted approach of regional planning to decongest New Delhi by enabling holistic development of the region.

Until now, the NCR has undergone lopsided development with a few satellite cities of New Delhi emerging as business hubs, while other sub-regions continue to struggle. This unicentric development has prevented the region from realising its true economic potential. A report by Oxford Economics has projected NCR's GDP to hit \$1 trillion by 2030.

This trend of domestic migration, particularly in New Delhi, has led to uncontrolled urban sprawl, posing serious challenges for infrastructure, environment and citizens' quality of life, constraining economic growth

With an average 33 per cent decadal growth, the population of NCR is expected to reach approximately 64 million by the year 2021, while New Delhi is set to overtake Tokyo to become the world's most populous city by 2028. The lack of planning and uncontrolled urbanisation in NCR in general, and Delhi in particular, has resulted in serious issues of over-stressed civic amenities, severe congestion, a high number of road accidents and hazardous pollution levels.



Regional Mobility in NCR

Despite the augmentation of new roads, flyovers and expressways, traffic congestion has continued to plague the NCR unabated. Plans for transport arteries that create enhanced regional mobility serving the aspirations of NCR have become critically important for sustainable development.

Worldwide in extended urban agglomerations around cities like Seoul, Paris and Tokyo, besides the dense public transit (e.g. BRT, [metros](#) and buses) network within urban boundaries, the importance of regional transit planning was realised early on. Accordingly, regional rails have been planned to serve as the main transport backbone of the region with urban public transit modes serving as feeders. To address existing issues and meet

organically growing demand, as well as the mobility requirements of the future to unlock the NCR's economic development potential, the need to develop the [Regional Rapid Transit System \(RRTS\)](#) was identified.

The National Capital Region Planning Board, a statutory body under the Government of India, in its Functional Plan on Transport for NCR-2032, identified eight corridors for constructing high-speed RRTS in the NCR by 2032. Out of these, three corridors were strategically prioritised for implementation in Phase 1.

The responsibility of designing, developing, implementing, financing, operating and maintaining RRTS has been assigned to the National Capital Region Transport Corporation (NCRTC), a joint venture with the Indian government and the state governments of Delhi, Haryana, Rajasthan and Uttar Pradesh.

The RRTS will connect cities, towns and urban centres across the region, largely serving the needs of daily commuters travelling within the larger urban agglomeration. RRTS is a high-speed, high-frequency, rail-based system with a design speed of 180 kmp and an average speed of 100 kmph. Once operational, the RRTS will be the NCR's fastest, most comfortable, most reliable and safest mode of transport. Efficient and sustainable mobility will enable polycentric development in the NCR.

The RRTS will connect cities, towns and urban centres across the region, largely serving the needs of daily commuters travelling within the larger urban agglomeration

RRTS is a first-of-its-kind project in India. The priority corridors of Delhi-Ghaziabad-Meerut, Delhi-Panipat and Delhi-Gurugram-SNB-Alwar will not only converge at [Delhi's Sarai Kale Khan](#), but will also be **interoperable**. **Multimodal Integration** with other modes of transport is central to the project, with the intent of reducing travel bottlenecks for commuters adopting public transport. Integrated modes include airports, urban metro stations, Indian National Railway stations and inter-state bus terminus.

Equipped with state-of the art technology, best-in-class command and control systems, **ETCS Level 2** signalling, and ballastless tracks, the RRTS will not only revolutionise public transport in the region but will set a benchmark for similar future projects in India.

The Journey so far

The Delhi-Ghaziabad-Meerut corridor is the first RRTS corridor to be implemented by the NCRTC. The prime minister of India [laid the foundation stone](#) of the corridor on 8 March 2019. Civil construction work on the first 17 km of the corridor is already in progress, slated to be commissioned by March 2023. Tenders for the rest of the packages for civil construction will be called shortly and the full corridor is set to be operational by 2025. The Asian Development Bank (ADB) is [funding](#) around 60 per cent of the cost of the corridor.

RRTS will not only revolutionise public transport in the region but will set a benchmark for similar future projects in India

The other two priority corridors are in the advanced stages of government approval. Pre-construction activities like geotechnical investigations, detailed designing and surveys are

in progress on the [Delhi-Gurugram-SNB-Alwar](#) corridor. Multilateral lending agencies like the Asian Infrastructure Investment Bank (AIIB), Japan International Cooperation Agency (JICA) and World Bank, including ADB, have shown keen interest in funding these RRTS corridors.

With a team of its own experts, NCRTC has collaborated with several leading global organisations – such as M/s Ayesalngenieria, M/s ADIF and M/s INECO of Spain, M/s ITALFERR of Italy, and M/s Systra and M/s Egis Rail of France – in various technical areas related to conceptualisation, design, planning and integration for efficient implementation of the project.

Benefits of RRTS

The prime minister's vision of 'New India' envisages an equitable and prosperous nation supported by a friendly ecosystem for economic growth. In New India, a sound mobility infrastructure network will define the transformation of cities in a more planned, equitable and sustainable manner.

RRTS, with the capacity to move 70,000-80,000 passengers per hour per direction, with minimal footprint on the land, will act as the transport backbone of the NCR. This next-generation infrastructure will not only be effective in curbing ills like urban sprawl, air pollution, road congestion and accidents, but will also be able to cater to the growing mobility demands of New India for the next 50-60 years. RRTS will be immensely advantageous in controlling the urban sprawl of New Delhi as well as in decongesting the city. Along with a fast, reliable and safe transit system, the regional rapid rail will also offer a range of other socio-economic benefits to the NCR.

The RRTS will result in substantial time savings by cutting the current travel time for a 100km journey of around three to four hours by about a third on its routes. Around two million daily commuters are likely to benefit from the operations of Phase 1 corridors. The Delhi-Ghaziabad-Meerut corridor alone is expected to remove around 100,000 vehicles from the roads, resulting in less pollution, relief in road congestion and a significant reduction in road accident cases.

This next-generation infrastructure will not only be effective in curbing ills like urban sprawl, air pollution, road congestion and accidents, but will also be able to cater to the growing mobility demands of New India for the next 50-60 years

The RRTS will also enable industries and businesses to have better access to a workforce with varied skillsets. The high-speed regional rapid transit system will bring people closer to opportunities; construction of the Phase 1 corridors alone is expected to create around 21,000 direct jobs⁸. The adoption of the government's 'Make in India' policy will also help in generating direct and indirect employment.

An easy, safe and faster commute by RRTS would improve access to healthcare, education and economic opportunities, leading to improved quality of life and delivering progress through speed.

This article first appears in [Intelligent Transport](#)

Vinay Kumar Singh

<http://www.ncrtc.in>



Vinay Kumar Singh is an officer of the Indian Railway Service of Engineers (IRSE) 1988 batch. Currently he is working as Managing Director of National Capital Region Transport Corporation (NCRTC), a company under the Ministry of Housing & Urban Affairs (MoHUA), formed to implement RRTS projects.

Ananadnagar-Garware College Section of Pune Metro likely to start by June 2020; India

By [Narendra Shah](#); 16/01/2020; Metro Rail News



Pune Metro Train Placed on Track

PUNE (Metro Rail News): Pune Metro's Stretch Between Ideal colony Anandnagar and Garware of is likely to start by June 2020 said mayor Murlidhar Mohol, who took an update about the ongoing projects in the city.

The trial run from the Ideal Colony to Garware College is likely to start by January 2020 along with the PCMC priority route. The Pune Municipal Corporation (PMC) priority stretch will start for public use by June 2020 he further added.

Brijesh Dixit, managing director, Maharashtra Metro Rail Corporation Limited (Maha-Metro), said, “The trial run from the ideal Colony to Garware College is likely to start by January 2020.”

A senior civic official on condition of anonymity said that issues related to slum dwellers at Paud road is yet to be resolved and authorities are taking steps to ensure that the project meets its deadline.

Mohol said, “Swargate to Katraj development project report (DPR) for the underground metro and the development plan report (DRP) for Vanaz to Shivrushti and Hadapsar to Swargate will be made for which Rs 32 lakh will be paid.”

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

Guided Bus Replacement by Tram Network in Caen; France

Metro Report International, Autumn 2019



New ALSTOM LRT City Tram for Caen, France

A three-line tram network was inaugurated in Caen on July 27th, 2019. This replaces the city's TVR guided bus A three-line tram network was inaugurated routes, which closed at the end of 2017.

Guided Light Transit – GLT (Transport sur Voie Réservée - TVR) in Castellón de la Plana; Spain

Castelló Guided Light Transit. Source: Better Transport Webpage



Optically guided Trolley Bus with Electro Motor in the Tyred Wheels, Castellon de la Plana, Spain

The GLT Trolley Bus is guided by a Cam-Recorder placed on the Top of the Windshield, which "reads" the Painted Lines on its assigned Platform. There's a Driver, who can override the System in Case of Failure. The Electro Motors are mounted inside the tyred Wheels.

Concept

Guided buses are buses steered by external means, usually on a dedicated track or roll way, that excludes other traffic, permitting the maintenance of schedules even during rush hours. **Guided Light Transit (GLT, French: Transport sur Voie Réservée or TVR)** is a public transport system manufactured by Bombardier Transportation and used in the French cities of Nancy and Caen, and in the Spanish city of Castelló de la Plana. The Caen system is being abandoned and will revert to conventional light rail by 2018.

Both of the systems in these cities are referred to as "tramways on tyres", and in common with tram systems they use a surface guidance system and in normal operation are powered by electricity drawn from an overhead wire. However, while the vehicles are guided by a central guidance rail, they ride on rubber tyres, not on rails.

There has been disagreement about whether they should be called "trams", for that reason and also because they are capable of being steered and operating independently of the guidance rail, using auxiliary diesel engines. GLT is effectively a model of guided dual-mode bus, but when GLT vehicles use a pantograph to collect current, as do those in Caen, they are not commonly considered to be trolleybuses.

English transport publications generally refer to the GLT and the competing Translohr system as "rubber-tyred tramways", but rarely simply as "tramways", as they are not tramways in the conventional sense, but neither are they buses when pantograph-equipped and operating in service as designed (i.e. in electric mode).

GLT is one of the few models (together with the Innovia APM) of rubber-tyred vehicles produced by Bombardier's transport division, which is otherwise focused on rail transport. In 2008 a small experimental Trolleybus Rapid Transit system using (initially) three 12m rigid optically guided Cristalis vehicles opened in Castelló de la Plana which is the capital city of the province of Castelló, in the Valencian Community, Spain. This is located to the east of the Iberian Peninsula, on the Costa del Azahar by the Mediterranean Sea. The system has been extended since then into a commercial public transportation system for the city of Castelló.

Although mostly operating as trolleybuses there will be some unwired sections, where the buses will operate away from the bus-way and in diesel-electric mode. The TVR is a trolleybus, which combines electric alimentation with a diesel motor. This guarantees a higher flexibility than a ordinary tramway. This flexibility and the lower construction and implementation cost were considered to be a solution to the public transport need in Castelló. This medium-sized city (150.000 inhabitants) is located in a region, which is in process of becoming a metropolis of more than 300.000 inhabitants.

Implementation

Castelló is the first Spanish city, where the TVR (Transport on reserved platform) has been introduced. The first part of two kilometers includes a stop at the intermodal station of Castelló, where it connects to buses and railway. The so-called TRAM - line 1 has a reserved platform, optic guiding and guarantees a high level of security. **The model is accessible for wheelchairs because the motors are inside the wheels. The EV bus is guided by a cam placed on the top of the windshield which "reads" the painted lines on its assigned platform. There's a driver that can override the system in case of failure.**

Moreover, it has traffic-light priority at all road crossings. The second and the third part of the line 1 of the TRAM will cross the city center and connect it with the harbour and the city of Benicàssim. It is planned that these two parts will enter into service by the middle of 2010. A future network will be created with the construction of line 2 to the city of Vila-real and with branches to two more cities located in the region

The TRAM runs at a frequency of one service every 8 minutes and 6 minutes during rush hour.

This frequency represents a very important change in the public transport offer of Castelló. Before the introduction of the TRAM, the bus lines run only every 30 minutes. Given that the University Jaume I is the main mobility source, the demand reaches 3.200 passengers during the card, Mobilis, which helps to reduce cancellation time.

The initiation of the TRAM has not only helped to improve public transport, but has also changed the conception of transport planning in the region of Valencia. The system has contributed to promoting more sustainable transport modes.

The creation of a big boulevard for pedestrians between the university and the city center and the intermodal station, make walking a viable possibility. It is intended to use the

optical guidance system throughout the bus-way section of the route - and not just for docking at bus stops.

Depending on the outcome of these trials, similar BRT systems will be installed in several other communities in the Valencia Region.

Costs

The idea behind this new BRT system is to create what is being called a 'new culture for transport'. Original plans (previous to crisis) were to provide for 90 km of lines and € 600 million network. The initial line entered in service in 2008, is 2.1 km in length, and is being treated as an experimental system, after which further decisions will be made.

250 kmph 'High Speed Metro' in Guangzhou Urban Rail Plan; China

17th January 2020; Railway Gazette International



CHINA: The Guangzhou Municipal Government has approved a 15-year plan to increase public transport's market share to 80% through the development of a comprehensive urban rail network based on three metro, 'express metro' and 'high speed metro' networks.

The journey time between the major cities within the Guangdong – Hong Kong – Macau Greater Bay Area would be reduced to 60 min. or less.

The Guangzhou metro network is currently 515 km long, placing it third in the world after Beijing and Shanghai.

Work is underway on the 160 kmph 'express metro' Line 18, which will run 65.3 km from Guangzhou *Dong* Railway Station to Wanqingsha with nine stations, and Line 22 which will run 31 km from Bai'etan to Wanqingsha with 10 stations. The planned Line 28 would run 110.3 km from Foshanxi Railway Station to Xintang with 18 stations.

The three planned 'high speed metro' lines would have a maximum speed of 250 kmph. One would run 81.7 km from Sino-Singapore Guangzhou Knowledge City station to Nansha with seven stations, and there would be the Airport Line and the Guangzhou – Conghua Line.

Cubic and Moovit announce Mobility-as-a-Service Co-Operation; UK

15th January 2020; Metro Report International



TECHNOLOGY: Fare collection technology company Cubic Transportation Systems and travel software developer Moovit have signed a strategic agreement for further collaboration in the Mobility-as-a-Service market, including integration of Moovit's multimodal trip planning with Cubic's mobile payment and ticketing capabilities. This will provide a platform offering service alerts, route information, multimodal trip planning and real-time arrival information.

'Cubic and Moovit share similar visions of the future of MaaS', explained Bradley Feldmann, President & CEO of Cubic Corp. 'This partnership is just the beginning of an alignment to serve the interest and operations of our customers, the public transit agencies'.

'Moovit's mission is to simplify urban mobility, and since 2012 we have worked with thousands of transit agencies across 3 000 cities to make that a reality', said Nir Erez, co-founder and CEO of Moovit. 'With Cubic's global footprint, we can advance the capabilities of public transit agencies and empower them with our rich data and world-leading multimodal journey planner, coupled with Cubic's powerful mobile ticketing, to provide urban mobility users with a true MaaS experience. Riders will be able to plan journeys and pay for them too, from the ease of a single platform.'

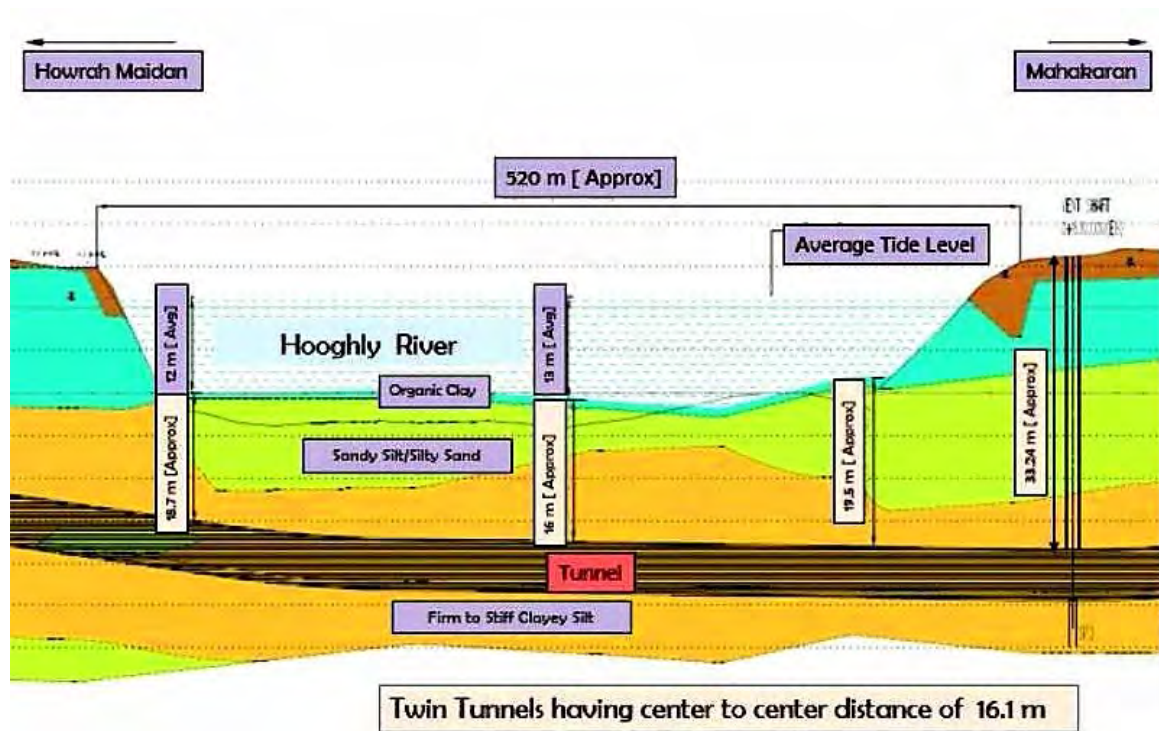
METRO NEWSLETTERS

on Technologies for

“URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, COMMUTER-RAIL, MONORAIL, AERIAL ROPEWAY, BOTTOM CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD CARS, SUSPENDED MONORAIL METRINOS

TRANSPORT TECHNOLOGIES AND ECONOMIC DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIROMENT



India's ambitious Metro Tunnelling Project under the Hooghly River, Kolkata

METRO Newsletter by Dr. F.A.

Wingler METRO 98, February 2020

SYNOPSIS:

The dynamics of the Urban Transport business is constantly changing.

In India, it is the challenging task, to bring Urban Transport also in the reach of poor travellers with low income. More cost effective and cheaper to operate Urban Transport Modes – other than capital investment intensive Metro Rail - are asked to tackle with the often chaotic and clogged traffic in urban areas.

In India, the more cost effective Metro Rail Substituent **“METRO-LITE”** – a Light Rail Transit, LRT, – is gaining a face. **“METRO-LITE”** (LRT) can run interoperable as City Tram, right-of-way as Underground, on dedicated/reserved at-grade or elevated Corridors, as Regional Rapid Transit and as well intercity on governmental Main Line Rail Tracks as Tram-Train, seamless under different Voltage and Current Feeder Systems; see in <http://www.drwingler.com>: Dr. F.A. Wingler, **“From the 1832 Horse pulled Tramway to 21th Century Light Rail Transit/Light Metro Rail – a short History of the Evolution in Pictures.”**



Bombardier Flexity LRT, Ontario, Canada, on reserved Corridor at Grade

Pressure to reduce Carbon-Dioxide emission in transport sector has risen also in India interest in **Hydrogen-Fuel Cell** technology for propulsion-power generation in regional trains on non electrified routes.

Ultra-Capacitors, to capture regenerated braking energy for reuse during acceleration, can be found nowadays in Metro Rail, Light Rail Transits, Trams and electric driven Buses.

Like Metro Rail in other countries, **Metro Rail in India is also moving towards a digital future** with the rise in the use and application of **Digitalisation, Internet of Things, Digital Twins, Artificial Intelligence, Enterprise Recourse Planning, Cloud Based Applications, Big Data and Building Information Modelling**. This evolution is worldwide revolutionising Transits; also in India. Combining edge and Cloud Computing with onboard **IoT** platform enables rail operators to consolidate and analyse multiple streams, including visual intelligence and artificial intelligence, potentially paving the way for **Automated Train Operation, ATO. Digitally twinning** all of the physical assets, from facilities and systems to environments, makes it much easier for engineers and data scientists to gain a deeper understanding of the complete urban transport network.



Remote Condition Monitoring, RCM, using sensor technology to improve condition monitoring, has entered also Indian Rail business market. IoT technology found application in rail for detecting problems with damaged infrastructure before they occur. **On-Line Monitoring of Rolling Stock System, OMRS**, and smart Yards being implemented for Machine assisted automatic Identification of Defects in Rolling Stocks. The Implementation of afore mentioned Technology driven automatic Predictive Maintenance Practices for up-keep of Rolling Stock not only will benefit Indian Railways on Account of efficient and safe Operation of Trains but will also benefit on economic Ground.

As Metro Rails/Urban Transport Technologies become more digitalized and connected over the clouds, they are increasingly susceptible to malicious hacks and **Cyberattacks**. Missing awareness is one of the biggest issues in this domain.

Delhi-Meerut RRTS Corridor is making progress. Metro Rail, Regional Rapid Transit and Bus Rapid Transit get married by Connectivity Hubs, also in India.

Hydrogen as eco-friendly and zero Carbon Dioxide-Emission propulsion fuel for Transits and regional Trains is on the rise and also under consideration in India.

Tramway is coming also back in Pakistan.



Topics:

I. Indian Activities:

- Indian Railways adopting Automation and Instrumentation for Predictive Maintenance of Rolling Assets – Paradigm Shift in Maintenance Practice.
- Innovation Ideas for 2020.
- Athenta *TRANSDAQ* Monitoring and Control System in Indian Metro.
- Namma Metro, Bangalore, to run at 2-Minutes Frequency.
- Innovative Method for Construction of Cast in-Situ down Stand for Installation of Elastomeric Neoprene Bearing in segmental Construction for Metro Viaducts.

- Tirumala, Tirupati, to get Light Rail Transit “**METROLITE**” soon.
- Chennai Metro Rail Ltd., MRL, begins Feasibility Study of Light Metro Rail to Link Tambaram-Velachery.
- Andra Pradesh Government invites Tenders for Visakhapatnam Light Metro DPR.
- State approves Cost effective elevated Light Metro Rail in Jammu and Srinagar.
- State approves Cost effective elevated Light Metro Rail in Jammu and Srinagar.
- Chennai Metro selected three Engineering Consultancies for Phase 2.
- Kolkata set to start in 2022 India’s first “Underwater” Metro under the Hooghly River.
- Indian Railways to inaugurate Hydrogen-powered Train.
- Kamanj Engineering Company, KEC, led Joint Venture cast first Segment for Delhi-Meerut RRTS Corridor.
- Noida Metro Rail Corporation, NMRC, encourages Bids for Parking Rights in order to increase Profits.
- Railway, Inter State Bus Terminal (ISBT) and Delhi Metro Rail Corporation (DMRC): Three Modes to connect RRTS Station to Anand Vihar.
- Hyderabad Metro opens Green Line.
- Railway Minister Shri Piyush Goyal inaugurates 5.3 km of Phase-I of Kolkata East-West Metro.

II. Global Activities

- The Rise of IoT and Big Data in Rail - Data-as-a-Service Platform for Asset and Maintenance Digitalisation.
- Honolulu Rail Transit, HART, Light Rail Project puts a Dagger into Center Renovation in Honolulu.
- Warszawa Trams to have Ultra-Capacitors.
- Qatar orders self-driving Electric Shuttles.
- Torino starts self-driving Shuttle Trials.
- Tracklaying starts on Dhaka Metro.
- Conversion of local Railway into a Busway for Buss Rapid Transit be studied.
- Bogotá Regiotram de Occidente Contract awarded.
- Lahore Tramway MoU signed.
- Bogotá Metro Concessionaire selected.

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

Indian Railways adopting Automation and Instrumentation for Predictive Maintenance of Rolling Assets – Paradigm Shift in Maintenance Practice; India

Posted on: 22th January, 2020, 3:40PM by PIB Delhi; Ministry of Railways

On-Line Monitoring of Rolling Stock System, OMRS, and smart Yards being implemented for Machine assisted automatic Identification of Defects in Rolling Stocks.

Installation of 25 OMRS Systems at 20 Locations in Progress over Indian Railways' Network; 40 yards will be converted into Smart Yards in Phase-I.

The Implementation of afore mentioned Technology driven automatic Predictive Maintenance Practices for up-keep of Rolling Stock not only will benefit Indian Railways on Account of efficient and safe Operation of Trains but will also benefit on economic Ground.

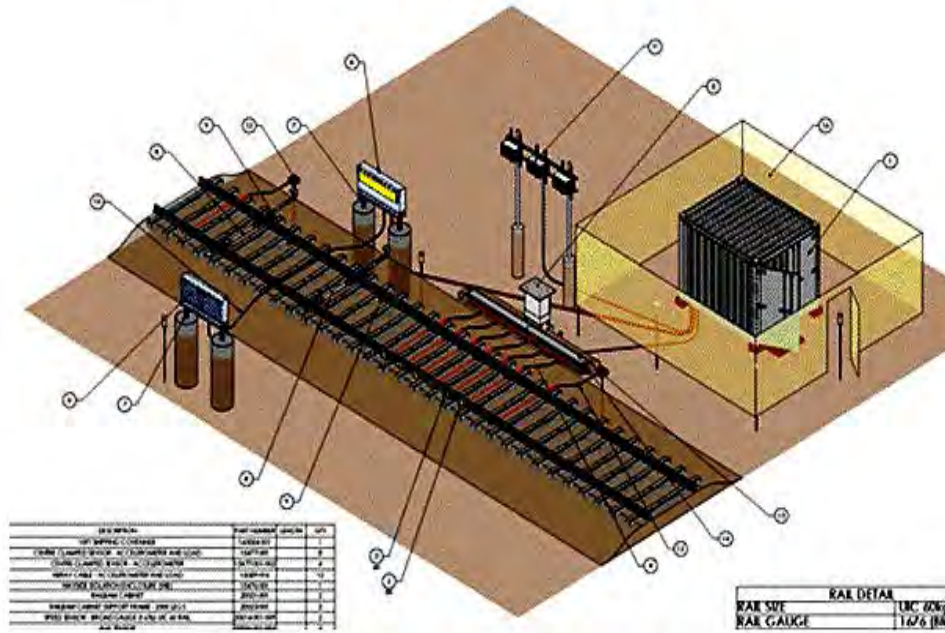
Indian Railways is moving towards the adoption of automation and instrumentation in its maintenance practices for detecting defects/deficiencies in rolling assets. The objective is to achieve machine assisted automatic identification of defects in the Rolling Stock, well before any catastrophic failure. This will lead to a **paradigm shift in maintenance practices** of Rolling Stock of Indian Railways from "**Time Based Maintenance**" to "**Condition Based Predictive Maintenance**" with a view to enhance reliability and availability along with improved safety of Rolling Stock during run.

For this, to begin with, **On-Line Monitoring of Rolling Stock System (OMRS)** is being adopted in Indian Railways. OMRS is a way-side inspection system consisting of Acoustic Bearing Detector (ABD) or Rail Bearing Acoustic Monitor (RailBAM) and Wheel Impact Load Detector (WILD)/Wheel Condition Monitor (WCM) to detect the faults in the bearings and wheels of rolling asset. This is an automated system for detecting defective wheels and bearings, and catching the same before it fails, thus resulting in efficient utilization of the coaches, wagons and locomotives. OMRS monitors the health of each Rolling Stock of the train in order to identify defective bearings and wheels. Defect report generation and alert communications takes place in real time for taking corrective action, accordingly.

The current practice of inspection of Rolling Stock over Indian Railways is largely based on manual inspection, which is either track side Rolling-in-Examination or pit examination of Rolling Stock in stationary or slow moving condition. The visual inspections are done by trained manpower either in a pit or track side location. But this relies on the individual judgment. Therefore, an automated defect detection system viz. OMRS is being adopted by Indian Railways which consists of following sub-systems:

- **Acoustic Bearing Detector (ABD) / Bearing Acoustic Monitor (RailBAM)** gives an early warning on possible defects in the bearing box, before reaching the stage of hot box.
- **Wheel Impact Load Detector (WILD) / Wheel Condition Monitor (WCM)** system measures the wheel impacts on tracks to identify the flat surface on wheels in Rolling Stock. This system is based on Accelerometer device to measure the wheel impacts.
- **PhotoTAG** system is used for vehicle identification using visual (photographic) identification technique.

OMRS System Overview – Site Details



Status of Implementation of OMRS:

- Installation of 25 OMRS systems at 20 locations is in progress over entire Indian Railways' network in phase-I on the sections identified by a high-level multi-disciplinary committee of Railway Board.
- 1st OMRS system has been installed at Panipat in Ambala-Delhi section of Northern Railway in November 2017 and a Central Control Room termed as "National Command Centre (NCC)" for monitoring of all OMRS sites has been set-up at Delhi Kishanganj in March 2018.
- After successful performance of 1st OMRS system at Panipat in March 2018, progressive installation of the remaining systems is being done.
- As on date, 6 OMRS systems have been installed and 10 systems are expected to be installed in current financial year 2019-20. The project of installation of remaining OMRS systems over Indian Railways is likely to be completed in the current calendar year 2020.



Panipat OMRS Site

Benefits from OMRS:

Summary of defects detected by OMRS in rolling stock upto June 2019 –

- Number of faults identified in Bearings by Rail BAM: Wagons- 33, Coaches – 6, Locomotives -1.
- Number of faults identified in Wheels by WCM: Coaches – 7.

Encouraged by the results of deployment of OMRS, including some critical detection which could have potentially been cause of an accident, not otherwise detectable by normal maintenance procedure, Indian Railways is now going ahead with greater adoption of track side based maintenance systems with an aim towards predictive maintenance.

Further, moving towards predictive maintenance practices in yards, Indian Railways is envisaging to convert its “freight examination yards” into technology driven “**Smart Yards**” for automatic detection of faults/defects/deficiencies in freight wagons. These Smart Yards will predict anomalies like Hot Wheel Hot Axle, defective bearings, defective wheels, hanging/loose/missing parts etc. long before any failure actually happens. Smart Yards will be equipped with various automated technology driven systems including OMRS, Hot Box Detector, Wheel Profile Recorder and Machine Vision Equipments etc.

The concept of smart yard is to use modern repair facilities, infrastructure, tools, automatic defect detection equipments and digital technology to enhance safety, reliability and productivity in freight trains operation.

The automatic defect detection equipments of Smart Yard shall provide advance data about hot axles and wheels, wheel flats, wheel profile & diameter, load imbalance, spring breakage, loose and hanging parts, wear condition of brake blocks etc. even before the rake arrives at the maintenance yard. It will then use this information for objective fault assessment and proactive staffing, thereby, reducing turn-around time while boosting safety and improving productivity.

Status of Implementation of Smart Yard:

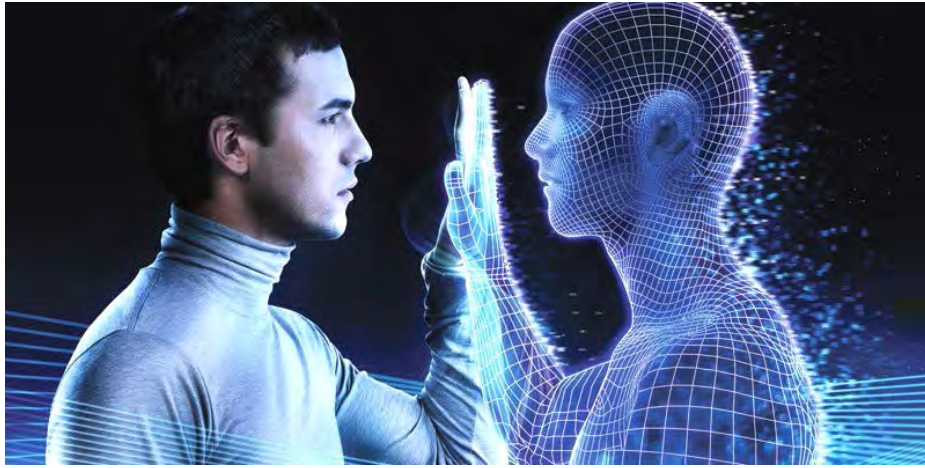
- Initially in 1st phase, 40 identified yards will be converted into Smart Yards.
- COFMOW (a unit of Indian Railways) has been nominated for carrying out the overall work of Smart Yards.

The implementation of afore mentioned technology driven automatic Predictive Maintenance Practices for up-keep of Rolling Stock not only will benefit Indian Railways on account of efficient and safe Operation of Trains but will also benefit on economic Ground.

Innovation Ideas for 2020; India

From Metro Rail News, Journal February 2020, p. 18

Digital Twin Models



Digital Twin

London's Crossrail, which will be known as the Elizabeth Line when it opens sometime in 2021, uses a digital twin model of the entire network. Digitally twinning all of the physical assets, from facilities and systems to environments, makes it much easier for engineers and data scientists to gain a deeper understanding of the complete network.

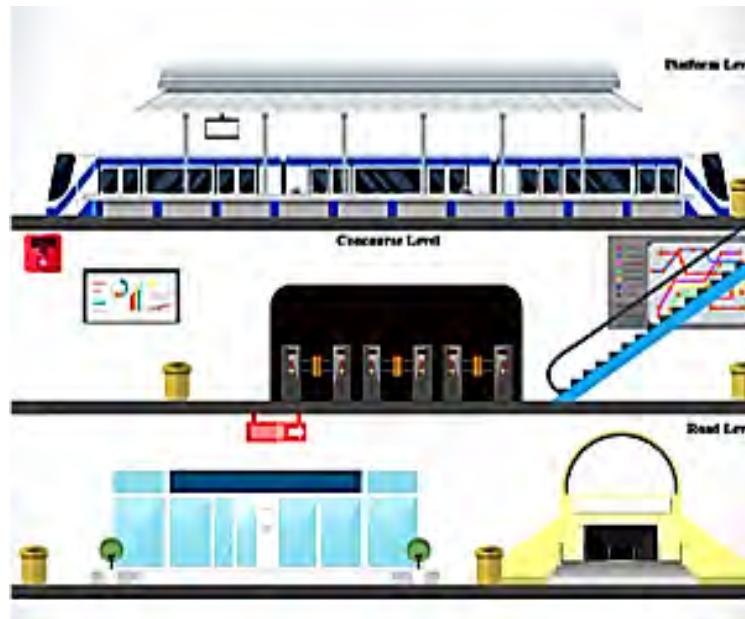
But it's not just a digital representation. It also allows teams to see what the actual physical system is doing, so they can monitor activities in real-time and respond to changes before they happen. This can help engineers design future networks that are smarter, more efficient and effective.

The Internet of Trains (Things)

The IoT (the Internet of Things, not just trains) refers to all the systems, software and devices that are connected to each other and have the ability to transfer data over the internet. This phenomenon has made many industries, including the rail sector, run more smoothly and efficiently. For instance, many trains are starting to offer WiFi included in their services. Fast train WiFi allows passengers to remain connected so they can still access all the information they may want to via their favourite apps and other resources even when they have left the station. For example, they can check emails, social media, online shop, watch movies and TV shows. By providing this passenger entertainment, Train and Metro Operation Companies, TOCs/MOCs, can ensure that their passengers are occupied while they travel, which helps to boost mood and improve their overall travelling experience. This, alongside other rail engagement tactics, will encourage passengers to travel with you again. Passenger WiFi can also provide Train Operation Companies with vital analytical data. It can enable TOCs to see passenger activity, such as the routes they take, the times they travel and how long they dwell on transport and in stations. With smarter analytics platforms, other data sources can be integrated into the WiFi platform, which can include ticket sales, parking information, weather feeds and more. This allows TOCs to build a complete passenger profile and begin to understand their passenger's behaviour in great detail. Data like this can help TOCs adapt their offerings to the specific type of passenger, such as providing targeted promotional messages and concessions at the station to boost brand awareness, improve engagement and increase sales even more.

Athenta *TRANSDAQ* Monitoring and Control System in Indian Metro; India

With TRANSDAQ all infra Subsystems can be managed from a single Console.



Transdaq is the manager or managers (MOM) solution for all the subsystems in an urban transport environment. Transdaq can map the entire electrical network of all the stations. From the LT panel to the end device, Viz to the HVAC or the Elevator, etc. So, in case of any electrical problem Transdaq can track as to where exactly has the problem occurred. **All infra subsystems can be managed from a single console.** Transdaq makes sure that each of the cameras deployed, along with the access controls, X-ray machines, metal detectors are working. With its **AI** tool, Transdaq would add features like face recognition, fire detection and look towards improving cleanliness across all the stations.

TRANSDAQ Monitoring and Control System can help you to do deep-dive integration into the urban transport systems and subsystems from a centralised console.

TRANSDAQ is a Manager of Managers (MOM), i.e. a system, which can integrate the Transport and Metro Rail systems, and save the cost of all EMSs and NMSs for all the subsystems for any Rail project. It also helps in building unified and security envelops over all the physically accessible locations in a rail project.

TRANSDAQ maximises the efficiency in operations and maintenance, to optimise costs and to deliver high uptime for metro systems and customer service. The system is extremely robust and scalable with the ability to work in a distributed environment where a cluster of Athenta Technologies Pvt. Ltd Appliances will operate in a multilayered architecture, ensuring Availability, Reliability, Sustainability and Efficiency for Metro Rail Infrastructure Management. **Athenta's Management Appliances** enables metro administration to integrate its complete infrastructure to perform tangible business to come. **This system facilitates effective communication between the disparate subsystems and devices for proactively alerting the operations staff on any performance degradations or changes in operational status.**

This helps instantly making aware of the cause of the deterioration so that the equipment or systems could be changed or repaired or put in maintenance.

Athenta TRANSDAQ solution created to fit the changing demands of the Metro Rails, and enabling the collection, processing, analysis, and reporting of critical data in an actionable format with life-cycle information on assets and resources," said, Gopal Joshi, Director Sales, Athenta Technologies TRANSDAQ is an application-based product, that delivers the Infrastructure Management for the Metro Rail, and **it has now become the preferred Telecom-SCADA Platform (from Software AG Bangalore Technologies Pvt. Ltd.) for Metro Rails in India."** SCADA, Supervisory control and data acquisition is a control system architecture comprising computers, networked data communications and Graphical User Interfaces (GUI) for high-level process supervisory management, while also comprising other peripheral devices like Programmable Logic Controllers (PLC) and discrete Proportional-Integral-Derivative (PID) controllers to interface with process plant or machinery.

The use of SCADA has been considered also for management and operations of project-driven-process in construction.

Namma Metro, Bangalore, to run at 2-Minutes Frequency/India

The newer Standalone Lines like Electronics City, IIMB and ORR-Airport are being designed for CBTC from the Beginning," BMRCL managing Director Ajay Seth said.

By [Neha Singh](#); 17/02/2020; Metro Rail News



BENGALURU, India (Metro Rail News): The three upcoming [Namma Metro lines](#) — Electronics City, IIMB and ORR-airport, the corridors to see trains running in every two minutes. Now passengers don't have to wait long for another train. Credit goes to the advanced Communication Based Train Control (CBTC).

During traffic hour frequency is 4 minutes and for non-traffic hours, it's 10 minutes, in existing corridors. The distance-to-go signalling system is used at present, in which the minimum time between two trains is two-and-a-half minutes.

"The newer standalone lines like Electronics City, IIMB and ORR-airport are being designed for CBTC from the beginning," [BMRCL](#) managing director Ajay Seth said. Communication Based Train Control can allow train headway to less than 90 seconds. "The present signalling system can handle three minutes' frequency. With CBTC, two-minute frequency is feasible, but reducing it to 1.5 minutes will require other operational improvements. Frequency doesn't depend only on signalling, but also civil design, location of turn backs and length of underground sections," he stated.

[Bangalore Metro Rail Corporation](#) Limited is also planning to upgrade the signalling system of the current Purple and Green lines. "The present systems are designed for 120-second frequency. Upgradation of existing lines will be necessary after 10 years once the ridership reaches 40,000 passengers per hour per direction (PPHPD). At present, it's about 22,500," Seth detailed.

It is stated by officials that repetition of trains will depend on actual requirement and Phase-2 platform lengths will be designed to accommodate only 6 car trains. The highest length will be 150 m for elevated stations and 192 m (platform and system rooms) for underground stations.

The state-of-the-art signalling system has already been implemented in new Metro systems in [Kochi](#) and [Nagpur](#). Whereas RV Road-Bommasandra (Electronics City) line will be running by November 2021, the additional two corridors Gottige-Nagawara (IIMB) and Silk Board-KR Puram-Kempegowda International Airport (ORR-airport) will be operational by 2024.

"CBTC allows operation of trains without drivers, but people are not ready to accept driverless trains. We have to install confidence in passengers," said an official. CBTC will assist maintain a safe distance between the trains with the help of sensors on the route and other systems.

Innovative Method for Construction of Cast in-Situ down Stand for Installation of Elastomeric Neoprene Bearing in segmental Construction for Metro Viaducts; India

From Metro Rail News, Journal February 2020, p. 41.

By Nagappa Hebbl, Be (Civil), Fie, Additional General Manager (const.) Metro Link Express for Gandhinagar Ahmedabad (Mega) Company Limited, Gandhinagar, Gujarat.



Invariably Bearings are to be provided to transfer the load from super structure to sub structure of all kinds of bridges. Bearing is a vital element of the bridge. The bearings are to be kept at true line and level, especially elastomeric bearing below the bridge are to be kept at true horizontal plain. It is very difficult to bring the pre cast down stand (constructed together) of pier segment parallel to elastomeric bearing and most of the time bottom of pre-cast down stand and top of Elastomeric bearing will not be in parallel resulting un equal load distribution over the bearings and sometime gaps were also notice. In order to overcome above practical problem, construction of cast in-situ down stand is must.

Introduction

- (a) Metro Rail network in India is rapidly expanding in major Indian cities more than 30 lakhs population. Around 15 cities have already been covered metro network at present. Metro Rail is only the mode for mass rapid public transport on high demand corridors in big and medium cities and lead to making growing cities more livable and sustainable.
- (b) Metro alignments generally run through the one end of city to other end and along the outer/peripheral ring roads. Majority of the metro alignment will be elevated structure (Viaduct) and only in central business, area will be underground Tunnel.
- (c) Elevated structure (Viaduct) constructed with segmental type of pre cast, post stressed box girder and most of places bearing used in viaduct are Elastomeric Bearings, only in sharper curves and span more than 31 m, a pot PTFE type bearings are used.
- (d) Elastomeric bearing are to be placed in true horizontal plane to avoid tangential forces. The horizontal plane at bearing location can be formed by constructing the down stand with predesigned gradient.
- (e) At present pre cast down stands are being constructing to achieve the horizontal plane in the pre cast segment itself.

- (f) After launching and matching, the pre cast segments stressed with standard practice. After stressing and aligning, the plan of the soffit of the precast down stand will not be in true horizontal plane, resulting the unequal distribution of loads over the elastomeric bearing and sometime gaps observed between girder and the bearings. In order to avoid this practical difficulty, in staid off pre cast down stand, a cast in situ down stand can be formed by the innovative method.

Proposed Superstructure System for Viaduct

The choice of superstructure has to be made keeping in view the ease of constructability and the maximum standardization of the formwork for a wide span ranges.

Types of Superstructures for Viaduct

Pre-cast post-tensioned segmental box girder,
pre-cast post tensioned segmental U-girder,
pre-cast pre stressed I-girder,
precast pre tensioned double U-girder.

Pre-cast post tensioned Segmental Box Girder

This essentially consists of precast segmental construction and requires gluing and temporary prestressing of segments. The match cast joints at the interface of two segments are provided with shear keys as in traditional segmental construction. The main advantages for this type of superstructure are:

1. Flexibility of choosing a span configuration ranging from 16m to 37m.
2. Good Aesthetics.
3. Can be used at locations having sharp curves (of the order of 200m).
4. Ease of Transportation.
5. It can be extensively used for viaduct stretches having problems of utility, road crossings etc.

A typical section of viaduct with box girder super structure having integrated parapet is shown at **Figure (a)**. The min. overall width of viaduct may be kept as 8500mm* for a Standard Gauge viaduct with 3.2 m wide coaches:

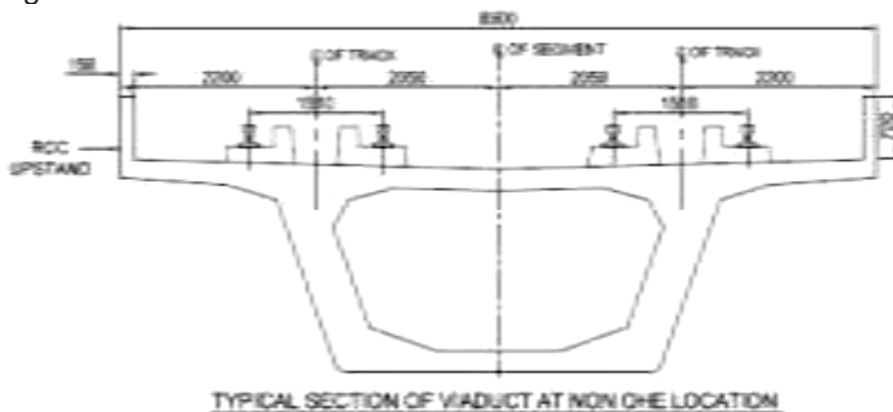


Figure (a)

Precast Pre-tensioned Twin U-Girder

Girders of various spans (19 m, 22 m, 25 m and 28 m) cast in casting yard and pre-tensioned. These girders were transported to site in trailers and launched in position by using double cranes of suitable capacity.

The main advantages for this type of structural configuration of superstructure are:

- Built in sound barrier.
- Built in cable support and system function.
- Possibility to lower the longitudinal profile by approximately 1 m compared to conventional design of box girders.

One span can be erected in a single night hence leading to faster pace of construction. A typical section of viaduct with twin U-Girder super structure is shown at **Figure (b)**. The minimum overall width of viaduct may be kept as 10150 mm* for a Standard Gauge viaduct with 3.2 m wide coaches:

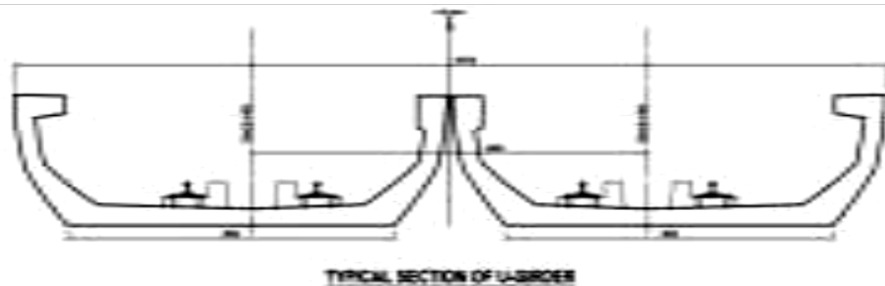


Figure (b)

Method adopted for Installation of Elastomeric Bearing in Practice at present

Different Metro Organizations are adopted different type construction methodology for installation of elastomeric bearings for Pre cast post tension segmental box girder.

However, method of forming the down stand is same in all metro constructions, but filling up of gap so formed is different in different metro. The some of the methods for installation of Elastomeric bearing adopted in segmental construction in metro are listed below:

First Method: Placing the Grout below the Bearing.



a) Top level of bearing pedestals over pier cap/Portal Beam were casting by keeping 25 to 30 mm lower than the required level to make the room for filling the cementitious grout.

(b) After matching all segments in the span and stressing operations were completed. Stressed girder placed on temporary bearing and continuing the same procedure for next span.

- c) At the time of aligning and placing the girder in the final location, girder moved with the help of jacks to bring final line and level (at this operation, it will difficult to bring the pre cast down stand/up stand to exact true horizontal plane).
- (d) Elastomeric bearing pads were placed attaching to the down stand/up stand provided at the soffit of the pier segment, irrespective of its plane (horizontal or inclined) resulting variable gap between elastomeric bearing and top of bearing pedestal constructed on top of pier cap.
- (e) In order to rest the elastomeric bearing, sim plates were placed in the gap formed between elastomeric bearing pad and concrete pedestal.
- (f) The gap between elastomeric bearing pad and pier pedestal grout is filled with free flow from top of viaduct.
- (g) Proper shattering arrangement was made to hold the grout by steel angles.
- (h) Finally, thickness of grout varied from 25 to 110mm in depth and grout stick to the elastomeric bearing pad.

Second Method: Placing of Grout above the Bearing

- (a) Pedestals are casting to the required line and level and placing the elastomeric bearing pad on the top of pedestals
- (b) A grout is filled through pipe (vertical duct) provided in the pre-cast pier segment directly over the bearing with suitable shuttering arrangements:



Third Method: By Fixing Steel Plate 8 to 25 mm thick over 3 to 10 mm thick Epoxy Grout :



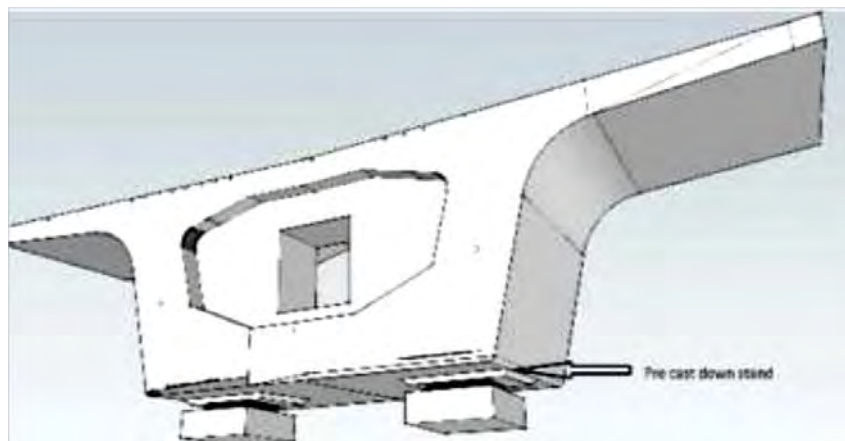
Fourth Method: Grinding the Surfaces of the Concrete at Top and Bottom of Elastomeric Bearing and Filling Grout if required:



Conclusion on Method adopted for Installation of Elastomeric Bearings at present

The above construction methods are not in accordance with the standard code of practice. The installation procedure explained in the IRCEEN Publication book at Paragraph 9.3, bearings must be placed between true horizontal surfaces (Maximum tolerance 0.2 per cent perpendicular to load) and at true plan position of their control lines marked on receiving surfaces (Maximum tolerance ± 3 mm). Concrete surface shall be free from local irregularities (Maximum tolerance ± 1 mm in depth). At par 9.7 of IRCEN publication book, for precast concrete or steel super structure elements, fixing of bearing to them may be done by application of epoxy resin adhesive to interface, after specified surface preparation.

Elastomeric bearings are supposed to be kept in true horizontal plane on bearing pedestal, without any foreign material. As such methodology adopted in construction of pre cast post tensioned segmental box girder is not in accordance with the procedure explained in IS code /IRCEEN publications.

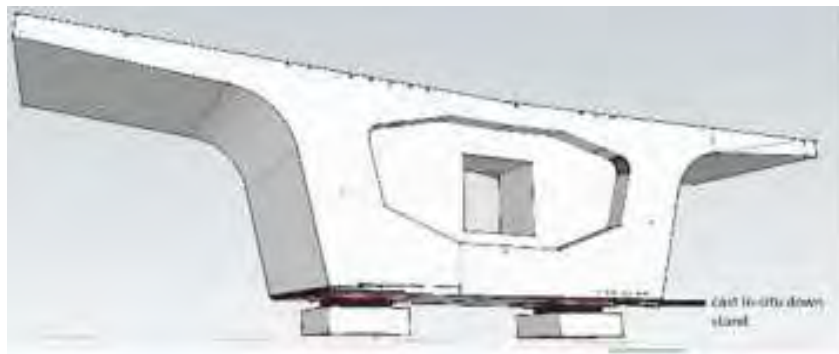


Innovated Method for Installation of Elastomeric Bearing

In view of the above, it is proposed to construct the cast in-situ down stand in staid off pre cast down stand, so that Elastomeric bearing can be placed in true horizontal plane. This cast in-situ concrete or high strength cementitious grout will be placed in the recess provided in the precast segment along with shear reinforcements.

The following methodology explains the procedure of construction of cast in-situ down stand.

1. A recess shall be formed at the location of bearing in the pier segment.
2. While casting of pier segment, dowels are to be kept in order to take care of shear force, if any and hold steel mesh.
3. A duct is to be created by placing the PVC pipe in pier segment itself. This will facilitate for pouring of non-shrink grout from top exactly over top of bearing.
4. After stressing the segments and aligning the girder to the required line and level, steel mesh is to be placed inside the recess of pier segment.
5. A dummy bearing of same size is to be placed on pier pedestals and proper shuttering arrangement shall be made to hold the insitu grouting/concreting.
6. After checking line, level and plane of bearing, a non-shrink grout is to be poured from top of the viaduct over the dummy bearing.
7. Shuttering arrangements are to be removed after attaining the required grout strength.
8. Replace the dummy bearing with real bearing after detail inspection of cast in-situ down stand.



With this methodology, both (Top and Bottom) surface of the bearing will be in true horizontal plane and rest of the procedure will be as per IS code/ IRCEN Publication book.

Tirumala, Tirupati, to get Light Rail Transit “*METROLITE*” soon; India

It will help lakhs of Devotees by reducing the Travel time. Presently, at least 1.5 lakh Visitants visit the Temple on any given Day.

By Neha Singh; 17/02/2020; Metro Rail News



Public Transport in Melbourne, Australia, with Light Rail Transit

HYDERABAD (Metro Rail News): Tirumala Tirupati Devasthanams chairperson Y. V. Subba Reddy met with NVS Reddy, The Managing Director of HMRL in Tirupati on Friday 14/02/20, where they addressed the possibility of a light rail transit system for the temple town to ease the traffic between twin Ghat Roads.

Reddy met the Dewasom board chairperson. The TTD chairman questioned if any rail-based transport solution could be devised for a journey from the foothills to the shrine.

When nothing concrete has appeared out of this informal meeting, the duo mulled over on whether a new line could be made across the hill or whether the existing 12-13 km long Ghat Road could be used in setting up a rail system, as done in Hyderabad.

An official release from the TTD said that Mr. Reddy suggested a light metro vehicle system for the terrain. It will help lakhs of devotees by reducing the travel time. Presently at least 1.5 lakh visitants visit the temple on any given day.

Chennai Metro Rail Ltd., MRL, begins Feasibility Study of Light Metro Rail to Link Tambaram-Velachery; India

Chennai Metro Rail Ltd (CMRL) has chosen Light Rail with this Stretch as the Localities it will traverse are densely populated with not sufficient Road Space.

By [Neha Singh](#); 13/02/2020; Metro Rail News



Chennai(Metro Rail News): Chennai Metro Rail Limited (CMRL) has recently started the feasibility study for the [Light Rail project](#) that will provide a link between Tambaram and Velachery. As per the Chennai Metro Rail Limited (CMRL) executives, the study, carried out by the firm [Systra](#), is expected to be finished within five months.

“The study will analyse and recommend the possible routes, that can be taken to connect [Tambaram](#) with Velachery. It will give an estimate of how much the project is likely to cost, the period of construction and how far it may benefit people,” an official stated.

The CMRL has taken Light Rail along this stretch as the localities it will traverse are densely populated with not sufficient road space. Light Rail can negotiate tight curves, and the period of construction will be less than what it takes to build Metro Rail, the officials said.

At a high-level meeting held recently, the Chennai Metro was asked to finish the feasibility by July 2020, thus the project can be taken up at the earliest.



Neha Singh

Andra Pradesh Government invites Tenders for Visakhapatnam Light Metro DPR; India


Andra Pradesh Government cancels Essel Infra Consortium Contract and issued Orders for calling Quotations for Preparation of Detailed Project Reports (DPRs)



Animation of Low Floor, 75 kmph, Tatra Yug Tram, Ukraine, for Visakhapatnam Light Metro Rail

AMARAVATI (Metro Rail News): The Andra Pradesh Government cancels the Essel Infra Consortium contract and issued orders for calling quotations for preparation of Detailed Project Reports (DPRs) in respect of Visakhapatnam light metro for a length of 79.9 km across 10 corridors in the city as well as transaction advisory from Delhi Metro Rail Corporation (DMRC), RITES Ltd and Urban Mass Transit Company (UMTC) Ltd.

Government-issued orders cancelling the bid received from [M/s Essel Infra Consortium](#) for the development of Visakhapatnam Metro Rail Project, on Friday.

LIGHT METRO RAIL PROJECT FOR 2020-24		
	PHASE 1	
	Corridor 3 Thatichetlapalem to RK Beach 6.91 km	
	Corridor 4 Kommadi to Anandapuram Junction 8.3 km	Corridor 5 Law College to Marikavalasa 8.21 km
	Corridor 2 Gurudwara to Old post office 5.26 km	Corridor 6 Anandapuram Junction to Bhogapuram airport 17 km
	TOTAL LENGTH 79.91 KM	

In the GO MS No 99, J Syamala Rao, Secretary, Municipal Administration and Urban Development department stated that “Government decided to appoint a new consultant for preparation of the revised DPR for the development of Light Metro Rail Project at Visakhapatnam”.

The Managing Director, Amaravati Metro Rail Corporation Limited (AMRCL), Vijayawada, stating the Terms of Reference (ToR) for preparation of the works has requested to permit him to appoint consultants for calling quotations from DMRC, RITES and UMTC.

State approves Cost effective elevated Light Metro Rail in Jammu and Srinagar; India

By Anushka Khare - February 9th, 2020; Urban Transport News.



Jammu & Srinagar, India (Urban Transport News): To ease the public transport in twin cities of Jammu and Srinagar, the Jammu & Kashmir Government on 6th February 2020 has approved the two light metro rail projects in the state. In a meeting chaired by Lieutenant Governor, GC Murmu, the Administrative Council (AC) approved the proposal of the Housing and Urban Development Department (HUDD) to build elevated **Light Rail** System in both the capital cities of Jammu and Srinagar. After detailed discussion in the meeting, it was felt that an efficient urban transport system including Mass Rapid Transit System (MRTS) is essential for an inclusive and environmentally sustainable growth process. To meet this objective, elevated Light Rail Light Metro Rail 2/4 Systems have been conceived for Srinagar and Jammu cities to provide “best-in-class” mobility in terms of safe, reliable, convenient, **cost-effective** and sustainable public transport systems.

The elevated light metro rail system will not only facilitate easy and quick movement of people but also have a positive impact on the economy and quality of life in these cities.

The Light Rail Transit System (LRTS) in Jammu will have one corridor from Bantalab to Bari Brahmana with a total length of 23 km. whereas in Srinagar it will have two corridors, one from Indira Nagar to HMT Junction and second from Usmanabad to Hazuri Bagh, with a total length of 25 km. The capital cost of the project, at current prices, including land,

R&R and taxes are estimated to be Rs 4,825 crore for Jammu Light Metro and Rs 5,734 crore for Srinagar Light Metro. The Railway consultancy firm RITES Limited has recently submitted the detailed project reports (DPRs) to Housing and Urban Development Department (HUDD) for both cities. The Administrative Council has authorized HUDD to submit both DPRs to Central Government for appraisal and funding including external funding. According to the DPRs, the project has a completion time of four years and is expected to be completed by December 2024. The expected ridership of this Jammu & Srinagar light metro rail has been estimated to be 2.6 lakh by 2024 which is expected to increase up to 5.42 lakh by 2044 in each city. After getting approval from the Centre, the Housing & Urban Development Department (HUDD) will notify the Government lands within 500 meters on either side of the corridor and reserve the same for development purposes. In the meeting, the Lieutenant Governor has also approved in principle the engagement of Delhi Metro Rail Corporation (DMRC) for handholding the MRTCs for appraisal and approval of the DPRs by the Central Government and for any possible external funding.

State approves Light Metro Rail in Jammu and Srinagar; India

An official Statement approved the elevated Light Rail System for Srinagar, Jammu..

By [Neha Singh](#); 10/02/2020; Metro Rail News



Sample Image of articulated Adtranz Incentro Tramway (Nantes, France)
for Jammu-and-Srinagar Lite-Metro-System

JAMMU & SRINAGAR (Metro Rail News): To relieve the public transport between two cities of [Jammu and Srinagar](#), the Jammu & Kashmir Government has confirmed the two light metro rail projects in the state on 6th February 2020.

A meeting led by Lieutenant Governor, GC Murmu, the Administrative Council confirmed the proposal of the Housing and Urban Development Department to make [elevated Light Rail System](#) in both of the capital cities of Jammu and Srinagar.

During a meeting after having a detailed discussion, it was considered that an efficient local public transport system including [Mass Rapid Transit System \(MRTS\)](#) is important for an inclusive and environmentally sustainable growth method. To complete this target, elevated Light Rail Systems have been conceived for Srinagar and Jammu cities to provide superior mobility in terms of security, credible, **cost-effective**, useful and sustainable public transport systems. The elevated light metro rail system will not only facilitate easy and quick movement of people but also have a positive impact on the economy and quality of life in these cities.

The Light Rail Transit System in Jammu will have its one corridor from Bantalab to Bari Brahmana with an entire length of 23 km, whereas in Srinagar it will have two corridors, the first one is from Indira Nagar to HMT Junction and the second is from Usmanabad to Hazuri Bagh, with an entire length of 25 km. The investment cost of the project, at current prices, including R&R, land and taxes are supposed to be Rs 4,825 Crore for Jammu Light Metro and Rs 5,734 Crore for Srinagar Light Metro.

The Railway consultancy firm RITES Limited has newly submitted the final project detail reports to the Housing and Urban Development Department (HUDD) for both cities. The Administrative Council has authorized HUDD to submit both DPRs to Central Government for appraisal and funding including outer funding.

As per the DPRs, the project has an end time of four years and is supposed to be completed by December 2024. The expected ridership of this Jammu & Srinagar light metro rail has been estimated to be 2.6 lakh by 2024, which is supposed to increase up to 5.42 lakh by 2044 in each city.

After receiving approval from the Centre, the Housing & Urban Development Department (HUDD) will notify the Government lands within 500 meters on each side of the corridor and reserve the equivalent for development purposes.

During the meeting, the Lieutenant Governor has also confirmed in principle the engagement of [Delhi Metro Rail Corporation](#) for handholding the MRTCs for appraisal and approval of the Detailed Project Reports, DPRs, by the Central Government and for any possible external funding.

Chennai Metro selected three Engineering Consultancies for Phase 2; India

By [Narendra Shah](#), 28/01/2020; Metro Rail News



CHENNAI (Metro Rail News): The Chennai Metro Rail (CMRL) Limited has selected three consultancies in moving into the second phase of the Chennai metro project. [The Chennai metro rail](#) has elected the three engineering consultancies Japan's **Nippon Koei**, **Aarvee Associates**, and **Balaji Railroad Systems** contracts to provide the first sections work of 52 km of phase two which costs rupees 350 crores.

The contractor will undertake the initial section of the 52 km work for construction and after that a further section of this project will be conducted which is nearly half of the complete phase two that is 119 km. Some of the mandates, that all three consultancies will advise on the construction of two CMRL Corridors. This 52 km metro rail line covers rail route from Madhavram to Sholinganallur and also Mahavram to Chennai Mofussil Bus Terminus (CMBT). In which the JICA is funding the second phase along with the involvement of the Asian Infrastructure Investment Bank (AIIB).

As yet the AIIB has sanctioned just over rupees 2300 crore for the help of the Chennai Metro Rail. The three engineering consultancies working with a crucial role in this project are the key players in this field. There is a Japan-based global in-fracture consultancy Nippon Koei that has been working for more than 70 years of experience, and now it's working in projects on 160 countries across the globe.

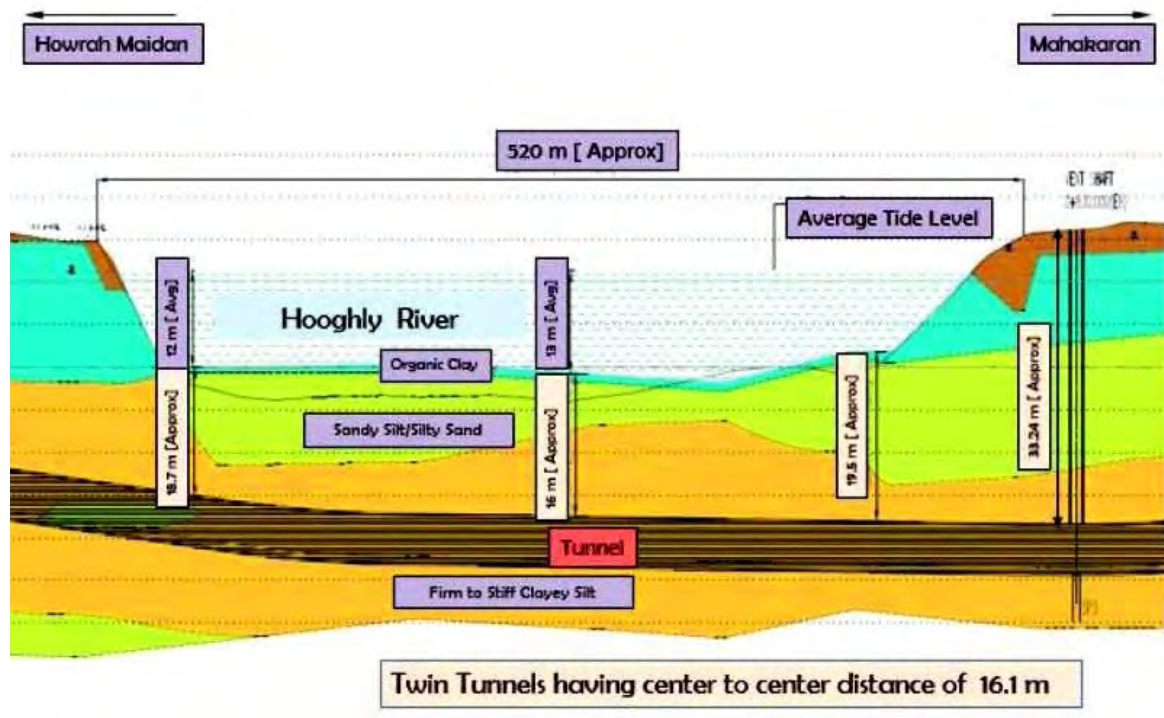
it is officially said that the general consultant will go over every activity whether it is calling for tenders for different works or surveillance that how they are carried out by the contractors. They will look into all the aspects of the project and making sure that the contractors are taking seriously the quality of work and safety.

Chennai Metro Rail has already launched for the initial section and for the civil work and its being expected to announce the construction in the upcoming months.

It expects that the initial work will be started by June 2020 and along with it has also announced that floated tenders for general consultants for the second stretch of the project.

Kolkata set to start in 2022 India's first "Underwater" Metro under the Hooghly River; India

By [Narendra Shah](#), 28/01/2020; Metro Rail News



India's first "Underwater" Metro Rail Tunnelling Project

KOLKATA (Metro Rail News): There is good news for Kolkata residents. [India's first underwater metro train project](#) started and will be accomplished by 2022. This "underwater" metro will carry out almost 900,000 people regularly and cover a distance of 520 m in less than a minute under the Hooghly River. The managing director of KMRC has told that authority is looking for the final installment of the payment of Rs. 20 Crores in the next couple of years. Japan International corporation agency (JICA) contributed a soft loan of Rs. 41.6 billion. The government expects, there will be no more cost escalation.

It will be a great relief for the city because it is going to reduce congestion and improve environmental pollution. The train will run under the city's ideal Hooghly River with 520 meters of its distance. The inner diameter of the tunnel is 5.55 m, and the width of the wall is 27.5 cm. The protection from the water of the Hooghly River Tunnel is shield with four layers of protection. However, the first tunnel work has started from Howrah Maidan on 21st April 2016, and another is on 12th July. But because of so many hurdles, it took time for them to reach out to the river.

Almost around 40% of total transport dealt by these two metro services. India's oldest metro started in 1984 with a north-south service was due to broadening by 2014 but faced a challenge comprising squatters on the intended route. This problem has increased the total project cost amount rising to about rupees 86 billion for just 17 km from rupees 49 billion for 14 km.

The Japan international corporation agency funded loan will repay by KMRC over 30 years after the first six years moratorium and its interest rate will be between 1.2 % to 1.6 %. Indian Railway Ministry has owned 74 % of the East-West Metro Project and rests 26 % has owned by the nation's Ministry of Housing and Urban Affairs.

"We don't anticipate any further cost escalation now", said Manas Sarkar, Managing Director, KMRC.

Indian Railways to inaugurate Hydrogen-powered Train; India

India Railways is operating on the Development of a Hydrogen-powered Suburban Train

By [Neha Singh](#), 07/02/2020 Metro Rail News



Hydrogen/Fuel Cell Powered Regional Train by Alstom; Type CORADIA eLINT operating in Revenue Service since 2018 in Niedersachsen, Germany

NEW DELHI (Metro Rail News): India Railways is working on the development of a Hydrogen-Fuel Cell powered suburban train and has floated an Expression of Interest for industry participation, rail minister Piyush Goyal said.

“Hydrogen is planned to be sourced from industry in India. Hydrogen production is not planned by Indian Railways. The decision on deployment of hydrogen-propelled trains for long-distance routes will be based on the development of the technology,” Goyal said in a written reply in Parliament.

TATA Motors has developed seven hydrogen fuel cell buses, which comply with International Safety Standards of Hydrogen Safety. Also, the International Standards Organisation, Society of Automotive Engineers and United Nations have published stringent safety standards for use of hydrogen in transport vehicles.

“Type test of these vehicles have shown that Hydrogen as a transport fuel is safe to handle and use. Similarly, safety aspects concern for passengers shall be an integral part of the technical specifications of the hydrogen-powered trains,” the Minister said.

Kamanj Engineering Company, KEC, led Joint Venture cast first Segment for Delhi-Meerut RRTS Corridor; India

KEC-CCECC JV bags a civil Contract worth Rs 579.76 Crore from NCRTC on August 8, 2019.

By Nayendra Shaj on August 8th, 2019, Metro Rail News



RRTS-Segment Form Work

GAZIABAD, (Metro Rail News): The consortium of KEC International and China Civil Engineering Construction Corporation Ltd. (KEC-CCECC JV) has cast the first segment for the Delhi-Ghaziabad-Meerut RRTS viaduct at NCRTC's casting yard at Vasundhara, Ghaziabad on January 31, 2020.

The KEC-CCECC JV bags a civil contract worth Rs 579.76 crore from National Capital Region Transport Corporation (NCRTC) on August 8, 2019.

The KEC-CCECC JV is responsible for the construction of elevated viaduct from start of elevated ramp near Sahibabad RRTS Station up to end of Ghaziabad RRTS Station, including all special spans and two nos. of elevated RRTS Stations viz., Sahibabad and Ghaziabad [excluding Architectural Finishing & Roof structure of Stations] of Delhi-Meerut RRTS Corridor.

"Piling and pier construction on the site have already been underway and are visible on the 17-km long priority section between Vaishali ramp and Duhai EPE. The fabrication of launching girder is near completion and is likely to be erected shortly", said in the statement issued by NCRTC.

"We are glad to share that KEC's Delhi-Meerut RRTS project for NCRTC is progressing at a swift pace. The first segment of the viaduct was cast at the Ghaziabad casting yard this week; Construction of pillars has also commenced", said in KEC International statement.

The spans shall be erected by placing these casted segments on the pillars using launching girders. The transportation of the segments to the launching locations shall be done in a manner causing minimum inconvenience to the public.

The Civil Construction of Delhi–Ghaziabad–Meerut RRTS corridor is in full swing and piling and pier works are being done on the 17 km priority section between Sahibabad to Duhai including stations Sahibabad, Ghaziabad, Guldahr and Duhai.

Noida Metro Rail Corporation, NMRC, encourages Bids for Parking Rights in order to increase Profits; India

Officials said that the selected Bidder shall be permitted to collect Parking cCharges and run the Parking Site of Noida Metro Rail Corporation (NMRC) at the selected Metro Stations.

By [Neha Singh](#); 11/02/2020; Metro Rail News



Noida (Metro Rail News): In order to increase the revenues from sources other than farebox, [Noida Metro Rail Corporation](#) has recently floated many tenders. Throughout these, the NMRC want to appoint private players for service of car parking lots and commercial space sales at metro stations in Sector 101, Sector 81, Sector 83, Depot and Sector 142.

Officials said the primary objective of [NMRC](#) for bringing parking policy is to ensure that metro commuters get car parking and ride facility at the metro stations.

This will not only facilitate genuine metro passengers but also encourage others to use metro services if the parking facility is made available to them, they said.

According to the above view, NMRC made these facilities possible at some of the metro stations where spaces are available for this purpose.

Further, the NMRC has invited e-bids for selection of licensee for granting parking rights at 16 metro stations of Aqua Line. These 16 metro stations Sector 51, Sector 76, Sector 101,

NSEZ, Sector 83, Sector 137, Sector 142, Sector 143, Sector 144, Sector 145, Sector 146, Sector 147, Sector 148, Pari Chowk, Alpha 1 and Delta 1.

Officials said that the selected bidder shall be permitted to collect parking charges and run the parking site of NMRC at the selected metro stations.

Railway, Inter State Bus Terminal (ISBT) and Delhi Metro Rail Corporation (DMRC): Three Modes to connect RRTS Station to Anand Vihar; India

Anand Vihar RRTS Station will be seamlessly connected with the Anand Vihar Railway Station, Delhi Metro's Stations along with the ISBTs at Anand Vihar and Kaushambi.

By [Neha Singh](#); 11/02/2020; Metro Rail News



Subway at Anand Vihar Terminal connecting Metro Station and Railway Station

NEW DELHI (Metro Rail News): Anand Vihar East Delhi is the capitals biggest transportation centre with the railway station with two [DMRC corridors](#) and two inter-state bus terminals on each side of the Delhi UP border. A new extension to the **Hub** is going to be the underground Anand Vihar Station with the distance of 82 km extended Delhi-Meerut Regional Rapid Transit System corridor, which will also seamlessly integrate these different modes of transport.

India's first rapid rail corridor between Delhi and Meerut will not just decrease the travel time among the two cities to only 55 minutes, but will also bring a transformation in integrating different modes of public transport. Station structure of Anand Vihar RRTS

would allow secured, convenient and hassle-free journey of commuter. As per the National Capital Region Transport Corporation (NCRTC), implementing agency of the RRTS project, the integration with these various modes of transport will be done by lifts, escalators, walkways, foot over bridges as well as tunnels. The combination is a vital feature of the RRTS project to provide a better travel experience to passengers.

“Anand Vihar is one of the busiest public place linked by several modes of public transport. Lakhs of people, among them senior citizens and children, use these transport modes daily, often with heavy luggage. The lack of adequate integration leads to unsafe road crossing and many level changes, making the journey unsafe, time consuming and inconvenient, and ultimately forces people to shift to private vehicles.” Said an NCRTC official

The construction of this station will be technologically sophisticated as RRTS trains will pass underneath the Delhi Metro Blue Line (Dwarka-Vaishali),” the spokesperson said.

Hyderabad Metro opens Green Line; India

10th February 2020; Metro Report



INDIA: The first section of Hyderabad Metro's Green Line was opened by Telangana state's Chief Minister Kalvakuntla Chandrashekhar Rao on February 7.

The 11 km route connects bus stations Jubilee and Mahatma Gandhi with a 16 min. journey time.

All nine stations are elevated.

A second section between Mahatma Gandhi bus station and Falaknuma Palace totalling 5.2 km in length is planned, but no start date for construction has been announced.

Railway Minister Shri Piyush Goyal inaugurates 5.3 km of Phase-I of Kolkata East-West Metro; India

February 14th, 2020; Rail News



[Minister of Railways](#) and Commerce & Industry, Shri [Piyush Goyal](#) on Thursday inaugurated and flagged off the Phase I of [East West Metro](#) corridor of [Kolkata Metro](#) connecting Salt Lake Sector V and Salt Lake Stadium and dedicated various other [Railway projects](#) to the Nation at a function in Kolkata. Speaking on the occasion, Shri Piyush Goyal said that the entire East-West corridor upto Howrah Maidan will be completed by December 2021 and expressed the hope that Kolkata Metro will become the preferred mode of transport for the people of the city.

Shri Babul Supriyo, Union Minister of State for Environment, Forest and Climate Change, and other dignitaries along with senior Railway officials were present on the occasion. Presently Metro services are run in Kolkata on only one North South corridor from Noapara to Kavi Subhas stations over a length of 27.3 km. This corridor was inaugurated 36 years ago in 1984.

Brief: Phase I of East-West Metro

East – West Metro is a 16.5 kms long stretch which connects Howrah on the West bank of River Hooghly with Salt Lake city on the East bank. The project is being executed by Kolkata Metro Rail Corporation Limited (KMRCL). 10.8 kms of the stretch is underground and 5.75 kms will be on elevated viaduct. It is India's first ever transportation project where trains will ply under the mighty river, Hooghly. This project will be immensely helpful in easing the traffic congestion of Kolkata – a 300 years old city and also in reducing vehicular pollution. Phase-I of East – West Metro which was inaugurated today is a 5.3 km long stretch having 6 elevated stations.



Features of the Project:

- The first ever transportation tunnel under any river in India.
- Platform Screen Doors to prevent accidents or intentional fall.
- Communication Based Train Control System (CBTC) having enhanced safety features like anti- collision and automatic train control mechanism.
- Passenger friendly features like lifts, escalators, concept of barrier free movement, designated parking for differently-abled, State of the art absorptive type noise barriers provided near hospitals/schools to reduce the train generated noise for comfort of the public.
- Estimated budget for Phase- I is Rs 2431 Cr. out of the total project cost of Rs 8574.98 Cr.
- Emergency Announcement and Fire Detection Mechanism in all coaches.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

The Rise of IoT and Big Data in Rail-Data-as-a-Service Platform for Asset and Maintenance Digitalisation; Global





The Rise of IoT and Big Data in Rail: Data-as-a-Service Platform for Asset and Maintenance Digitisation.

Honolulu Rail Transit, HART, Light Rail Project puts a Dagger into Center Renovation in Honolulu; Honolulu

Written by [Bill Wilson, Editor-in-Chief](#) .February 04, 2020, RT&S



The Honolulu Rail Transit (HART) now has a Line running right through the Neal S. Blaisdell Center. Any Plans to renovate the Civic Center have been killed, at least for this Year. The Reason?: HART's Capital Demand for its elevated Rail Project.

There is still just over 4 miles to be constructed on the [light rail route](#), and the cost for the final segment has yet to be determined. Construction bids are due in April, and officials are predicting the cost could be as much as \$1.4 billion. Honolulu Mayor Kirk Caldwell announced the Blaisdell Center renovation, estimated to cost around \$772 million, has been put on hold due to the "city's financial responsibilities for the operations of the upcoming rail service, in addition to a new administration and City Council starting in less than one year," Caldwell said.

The elevated rail project has been plagued with cost overruns and delays recently. Last February, a federal grand jury issued a [subpoena to HART](#) asking for copies of all unredacted minutes from board of directors meetings over the last eight years. The cost of the 20-mile rail line now sits at \$9 billion, making it the most expensive public works project in Hawaii history.

Caldwell wants the next administration to jump-start the Blaisdell renovation project. Upgrades are needed to better serve the public and so that the center can hold major events in Honolulu.

Warszawa Trams to have Ultra-Capacitors; Poland

28th January 2020; Metro Report International



POLAND: Medcom has selected Skeleton Technologies to supply energy storage systems as part of the traction packages that it is supplying for the next generation of Warszawa trams.

Last year, Tramwaje Warszawskie ordered 123 new trams from Hyundai Rotem, with options for up to 90 more. The mix of bidirectional and unidirectional vehicles to be assembled locally will have traction equipment from Medcom and ATM.

Skeleton Technologies is to supply ultracapacitors to capture regenerated braking energy for reuse during acceleration. This is expected to reduce the total energy consumption significantly, whilst minimising the amount of power drawn from the supply grid at peak times.

Announcing the contract on January 24th 2020, Skeleton Technologies said energy efficiency was becoming 'the key design criteria for any public transport system'. Its ultracapacitor technology would allow faster charging than batteries, which was important in capturing kinetic energy, given the frequent stops on typical tram routes. The equipment was designed for a life of 1 million charging cycles, compared with 2 000 to 3 000 for batteries, it said.

‘Skeleton Technologies is known as a trusted supplier of energy storage solutions in transportation applications’, said CEO Taavi Madiberk. ‘Our ultracapacitor systems will make the Warszawa tram one of the most modern and energy-efficient in the world.’

Founded in 2009 by two Estonian entrepreneurs in Tartu, Skeleton Technologies opened its German manufacturing base in 2017. In August 2019 the company signed a contract to supply ultracapacitors to Škoda Electric for the 114 trams to be built by Škoda Transportation for use in Mannheim, Heidelberg, and Ludwigshafen.

Qatar orders self-driving Electric Shuttles; Qatar

31th January 2020 Metro Report International



QATAR: Volkswagen AG and the Qatar Investment Authority have announced a deal for a fleet of self-driving electric shuttles ahead of the 2022 FIFA World Cup.

The partnership will deliver 35 autonomous, electric ID. BUZZ AD cars capable of carrying up to four passengers, as well as 10 Scania buses for bigger groups. The project is intended as an extension of the public transport network and will operate in semi-fixed routes throughout the Westbay area.

In addition, the scheme will also facilitate the creation of an appropriate legal framework and the necessary smart city infrastructure. Closed tests are expected to begin this year, with open trials in 2021 and a full project rollout by 2022.

According to Scania’s CEO Henrik Henriksson, the deal aims to encourage a focus on sustainable transport.

‘In the coming years, technological and infrastructural progress in electric and autonomous vehicles will be key enablers in that shift. A higher degree of sharing is also important, and through advances in autonomous transport it will be simpler to introduce more flexibility in shared people transport’, he said.

Torino starts self-driving Shuttle Trials; Italy

3. February 2020; Metro Report International



ITALY: The City of Torino has started trials for its first self-driving shuttle programme. The trial will last for four months and will provide transport services within the United Nations International Training Center's ILO campus in the city.

The Olli electric vehicles are supplied by Arizona-based Local Motors, which 3D prints 80% of the shuttle's parts. The cars can carry up to 12 passengers at 25 km/h and have a range of up to 50 km on a single charge.

Tracklaying starts on Dhaka Metro; Bangladesh

29th January 2020, Metro Report International



Icon Engineering Services is providing geotechnical and testing Support for the Construction of Dhaka Metro Line 6

BANGLADESH: Tracklaying has started on Dhaka's first metro line, following a ceremony at the Uttara depot site attended by Minister of Road Transport & Bridges Obaidul Quader and Dhaka Mass Transit Co Managing Director M A N Siddique.

Running from Uttara in the northwest of the capital to Motijheel in the city centre, the 19.9 km elevated Line 6 is being developed by DMTC, with 75% of the 220 bn taka cost being funded through a loan from Japan International Co-operation Agency. Serving 16 stations, it is currently expected to open by the end of 2021. Design capacity is put at 60 000 passengers/h in each direction.

Trackwork, CBTC and the 1.5 kV DC overhead catenary are being supplied by a joint venture of **Marubeni and Larsen & Toubro**, under a ¥ 55 bn railway systems contract awarded in June 2018. **Kawasaki Heavy Industries and Mitsubishi** are supplying a fleet of 24 six-car trainsets under a ¥ 40 bn contract which includes the fitting out of the maintenance depot.

According to the minister, around 8.5 km of viaduct for Line 6 has now been completed, with DMTC reporting that work was about 40% complete by the end of December 2019. Tracklaying will initially be concentrated on the depot area before heading south towards the city. The first Japanese-built trainset is expected to be delivered in June.

Explaining that the government hopes to complete six metro lines totalling 175 route-km by 2030, Quader said construction of lines 1 and 5 would begin 'very soon'. Line 1 would run underground from the city's main station at Kamalapur east to the international airport, with a branch running south from Notun Bazar to Purbachal bringing the total length to 31 km. The 20 km Line 5 would start from Valara, and run north in tunnel from an interchange with Line 1 at Notun Bazar to Gabtoli and on viaduct from there to Hemayetpur.

Conversion of local Railway into a Busway for Buss Rapid Transit be studied; Denmark

5th February 2020, Railway Gazette International



DENMARK: A feasibility study for converting the Østbanen local railway in eastern Sjælland into a busway is to be undertaken following an agreement between Minister of Transport Benny Engelbrecht and the regional council.

The jointly-funded Dkr3.5m study is to be undertaken in parallel with a current study into modernisation of the railway which links Køge with Rødvig and Faxe Ladeplads. Both studies are to be completed by June.

Østbanen operator Lokaltog recently reduced the maximum speed of services from 100 to 75 kmph because of the condition of the track. Infrastructure renewals are expected to take 2½ years and cost at least Dkr 660m, which the regional council does not have, and so the authority wants to study all the options before making a decision on the best way forward.

Announcing the agreement to undertake a **bus rapid transit** study on January 28, Engelbrecht said the development of electric and driverless buses might provide new opportunities for 'high quality, cheap and climate friendly' public transport. Buses could be cheaper to operate, with the cost saving covering the busway construction costs. Buses would also be able run through onto existing roads, enabling services to be extended to destinations such as an educational campus in Køge.

Chairman of the regional council Heino Knudsen said the Østbanen was a lifeline for residents, and a good public transport service was needed. Any BRT option would be required to provide least the same level of service, and the overall cost must be financially neutral. 'It is about finding the solution that gives citizens the fastest transport and as many departures as possible', he explained.

The BRT study does not affect a previous agreement for the region to take over responsibility for train services on the Køge – Roskilde route, with operations from the end of 2020 to be undertaken by Lokaltog which is owned by local authority bus company Movia (75%), various councils and private investors.

Bogotá Regiotram de Occidente Contract awarded; Colombia

13th January 2020, Metro Report International



Artist's Concept for Bogota Regio-Tram

COLOMBIA: A contract to design, build and operate the 39.6 km Regiotram de Occidente inter-urban commuter line linking Bogotá with its western suburbs was signed by China Civil Engineering Construction Corp on January 7.

The subsidiary of China Railway Construction Corp was sole bidder for the public-private-partnership contract, which runs for 26 years including 18 months for preparation, 30 months for construction and six months for testing. Passenger services are scheduled to begin in 2024.



The double-track, electrified 1 435 mm gauge line with 17 stations will mostly use an existing railway alignment to serve Mosquera, Madrid, Funza and Facatativá in the Sabana Occidente region. In Bogotá the line will connect with the planned metro.

The end-to-end journey time will be about 48 min, and future ridership is estimated at more than 130 000 passengers/day. Vice-Minister of Transport Juan Camilo Ostos Romero said residents would see 'a significant improvement in their quality of life' thanks to the reduction in travel times.

The overall cost of the project is 3.43bn pesos, with the national government to provide 1.32 bn pesos for construction and the Cundinamarca region 0.594 bn pesos. The contractor will also raise a proportion of the capital funding.

Egis reviewed studies for the project, working with local legal firm Duran & Osorio and financial consultancies Deloitte and Sumatoria.

Speaking at the contract signing, Governor of Cundinamarca Nicolás García Bustos said contracts would be awarded in February for studies of the Tren del Norte proposal for a line linking Bogotá with Zipaquirá, Cajicá and Chía.

Lahore Tramway MoU signed; Pakistan

28th October 2019, Metro Report International; Railway Gazette International



PAKISTAN: The Punjab Transport Department has signed a memorandum of understanding with Tong Hao Railway Vehicles Corp. for the development of a tramway in Lahore.

The department's Lahore Transport Co. would act as project promoter for the proposed PPP scheme that would see a route built along Canal Road from Thokar to Jallo.

Established in 2014, Tong Hao Railway Vehicles Corp is a joint venture of China Railway Signal & Communication Corp (66%), Xiangtan Electric Manufacturing Group Corp (17%) and Inekon Group (17%).

Local media reports that Tong Hao has selected the route and would supply a fleet of 30 two-section trams.

Bogotá Metro Concessionaire selected; Colombia

21th October, 2019; Metro Report International



COLOMBIA: The APCA Transmimetro Consortium was announced as preferred bidder to build and operate the first phase of the Bogotá metro on October 17, 2019. The contract is expected to be signed within 45 days.

APCA Transmimetro comprises China Harbor Engineering Co, Xi'an Metro Co, CRRC Changchun Do Brasil Railway Equipamentos e Servicos and Bombardier European Investments. It beat a bid from the Metro de Bogotá consortium of FCC, Carso, Promotora del Desarrollo de América Latina, Alstom, Ferrocarril Metropolitana de Barcelona and Metro de Medellín.

Six consortia prequalified for the design-finance-build-operate-maintain-transfer concession, of which five were shortlisted and two eventually submitted bids. Works are expected to begin in the second quarter of 2020, with opening due in 2024. The concessionaire will provide 20 years of operations and maintenance.

The 24 km Line 1 is planned to follow an elevated alignment in the southwest of the city linking Avenida Caracas with Calle 78, serving 15 stations. A fleet of driverless trains is to be procured, and CRRC Changchun would maintain them for 20 years.

METRO NEWSLETTERS

Transport Technologies for “URBAN MOBILITY AS A SERVICE”

PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT, LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN, COMMUTER-RAIL, MONO-RAIL, AERIAL ROPEWAY, BOTTOM CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER, WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD CAR, SUSPENDED MONO-RAIL METRINO

TRANSPORT TECHNOLOGIES AND ECONOMICAL DEVELOPMENTS IN MODERN URBAN/MEGAPOLIS ENVIROMENT



Visualisation with Bentley OPEN RAIL™ DESIGNER in Metro Rail/Light Rail/Commuter Rail Planning

Whether you're modelling metro or railway stations, tracks, pathways or over/underpasses, OpenRail™ Designer integrates all the project data and design details in a single composite 3D model. Now, you can ensure early detection of design conflicts and improved risk mitigation, enabling efficient railway projects.

**METRO Newsletter by Dr. F.A. Wingler
METRO 99, March 2020**

SYNOPSIS:

The applications of Building Information Modelling (BIM), Digital 3 D Modelling and Digital Twin in Metro Rail to support all stages of design and operation, from concept through planning, construction, maintenance, operation and infrastructure management, are worldwide on the advance. In India **BENTLEY SYSTEMS** is active with its infrastructure and engineering software solutions.

Light Rail Transit, LRT, is experiencing resurgence worldwide as cities modernise. LRT is currently the fastest-growing passenger rail mode, employing a full range of technologies and operational practices.

The works for the Delhi – Meerut Regional Semi-High Speed (160 kmph) Rapid Transit project are in full Swing.

Topics of the newsletter **METRO 99** are:

I. Indian Activities and Initiatives

- LIGHT RAIL TRANSIT “METRO-LITE” – the Cost-effective smaller Sister of Metro Rail in India; Giving LIGHT RAIL TRANSIT “METRO-LITE” Projects a Face.
- MMRDA floated Tender for Ropeway Project.
- In a Conversation with Mr. H. K. RAGHU, ED (Urban Transport & High Speed), RDSO.
- Tirumala Tirupati Devasthanams seeks Advice from HMR to start Tirupati – Tirumala Metro-Lite.
- Maha Dy CM wants two-Tier Flyovers on Pune Metro Corridor.
- Maha Metro begins Construction on Gaddigodam Multi-Layer Transport System.
- Delhi Metro launches 250 new e-Rickshaws at 12 Metro Stations.
- Kolkata East-West Metro resumes Tunnelling at Bowbazar.
- Kolkata East-West Metro remaining section to be completed in 10 Months.
- Delhi – Meerut Regional Semi-High Speed (160 kmph) Rapid Transit Railway Works in full Swing.
- India’s 160 kmph Regional Rapid Transit System launched.
- Patna Metro Corridor 2 Consultancy Contract awarded to AECOM.

II. Global Activities

- *OPEN RAIL* - Civil Design Software for Rail Networks by Bentley Systems.
- About Building Information Modelling, BIM.
- Re-Railing a Metro in a Tunnel.
- Automated Tram Operation demonstrated in Kraków.
- Fast-Charge Battery Development funded.
- Lithium Australia scores \$ 1.6 m to develop “fast Charge” Batteries.
- Lithium Australia scores \$ 1.6 m to develop “fast Charge” Batteries.
- Madrid invests € 35 m in electric Bus Fleet.
- Bogotá Metro changes Metro and BRT Lines.
- Odense Letbane takes Delivery of its first Tram.
- Iași orders 16 more Trams.
- First Śląskie Tram delivered for Katowice.
- Goiânia on-Demand Minibuses complete first Year.

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

LIGHT RAIL TRANSIT “METRO-LITE” – the Cost-effective smaller Sister of Metro Rail in India

Giving LIGHT RAIL TRANSIT “METRO-LITE” Projects a Face

By Dr. Frank Wingler, February 2020, Germany



Once upon a Time with *Electroliner* “Interurban” LRT at Chicago, USA

Light Rail Transit is experiencing Resurgence worldwide as Cities modernise. LRT is currently the fastest-growing Passenger Rail Mode, employing a full Range of Technologies and operating Practices:



Light Rail Transit is becoming a further mainstay for urban and suburban public transport in India.

With its recent publications, India's exclusive and leading news portal with a deep focus on urban mobility, metro railway projects, mass rapid transit systems, high-speed rail projects, transport infrastructure and smart public transport initiatives in smart cities projects in India, Symbroj Media Pvt. Ltd., New Delhi, is giving a face to the more cost effective Metro Rail Alternative "**METRO-LITE**" – a Light Rail Transit, LRT.

LRT/METRO-LITE, the "smaller Sister of Metro Rail", is not only more cost effective than **METRO RAIL**, it also offers a wider spectrum of flexible applications and installations with higher versatility.

LRT has a wide range from low capacity LRT at Kolkata to high capacity LRT at Ottawa.

"METRO-LITE" (LRT) can run on Narrow Gauge, Meter/Cape Gauge and Standard Gauge interoperable as City Tram, right-of-way as Underground, on dedicated/reserved at-grade or elevated Corridors, as Regional Rapid Transit and intercity on governmental Main Line Rail Tracks as Tram-Train, seamless under different Voltage and Current Feeder Systems. What is not yet well understood in India: In many cases, Meter (1000 mm) or Cape (1067 mm) Gauge for LRT offers several advantages over Standard (1435) Gauge as demonstrated in Japan and Switzerland. More examples we find in Italy, Spain, Austria, Germany and France. Throughout Switzerland the Light Rail Transits operate on Meter (1000 mm) Gauge and in Japan on Cape (1067 mm) Gauge. The Meter/Cape Gauges have the advantages to need less space and to allow tighter curvatures.

For more detailed information go to <http://www.drwingler.com>: Dr. F.A. Wingler, "From the 1832 Horse pulled Tramway to 21th Century Light Rail Transit/Light Metro Rail – a short History of the Evolution in Pictures."

From an Interview of METRO RAIL NEWS with Mr. H. K. RAGHU, Executive Director Coordination, Urban Transport and High Speed, Research Design & Standards Organisation, Ministry of Railways:

Metro Rail News: "Presently, the viability of costly metro rail projects, especially in smaller cities is under review, and the Government is planning to adopt the Metro-Neo and Metro-Lite transit systems. So how do you think that these transit systems can help smaller Indian Cities and also bring convenience to the passengers?"

Mr. Raghu: "**Metro-Lite**" and "**Metro-Neo**" both the concepts, though new to India, but both exist the world over. While we make this infrastructure in INDIA, we need to keep in mind that operating of these facilities is to be funded by the state to provide better and respectable transport facilities at affordable rates. Here it is pertinent to

mention that these facilities need to be energy efficient and preferably green. Metro-neo is less efficient than Metro-Lite, due to pneumatic wheels over the road, having higher friction loss of energy. For saving our climate, we need to look forward to **Hydrogen Fuel Cell Technology**, rather than going for electric energy, which at present is produced in INDIA, through coal energy-based steam thermal power plants, which is less efficient and a major cause of environmental concern. Till we become self-sufficient in energy, we must keep exploring the alternate methods of energy generation, especially for transportation.

Global Examples as Input for India`s METRO-LITE Projects in Pictures:



Light Rail Transit on elevated Structure at Addis Ababa; Ethiopia



Light Rail Transit at Addis Ababa, Ethiopia, at Grade on Shelter Station

Pict. by Aleksandr Prodan



LRT runs Underground in Cologne City, Germany



With LRT from City Centre to City Centre over Governmental Main-Line Rail Track between Hagen and Dortmund, Germany



With high Capacity Light Metro Rail through the City of Los Angeles, USA



High Capacity LRT Ottawa, Canada; Tunney's Pasture Station



With low Capacity City Tram on the Streets of Kolkata, India



Bombardier Flexity LRT, Ontario, Canada, on reserved Corridor at Grade



Public Transport with Light Rail Transit on the Streets in Melbourne, Australia



Animation of Low Floor, 75 kmph, articulated Tatra Yug Tram, Ukraine, for Visakhapatnam Light Metro Rail



Example Image of articulated Adtrans Incentro Tramway (Nantes, France) for Jammu-and-Shri-Nagar Lite-Metro-System



Articulated Cape Gauge (1067 mm) for LRT offers many Advantages: Fukui "Fukuram" LRT, Japan; Pict. by Kansai Explorer



With articulated Meter Gauge LRT Tram trough the City of Geneva, Switzerland

MMRDA floated Tender for Ropeway Project; India

The Authority has programmed a pre-Bid Meeting of interested Firms on February 25th 2020 to review the Project and assess their Suggestions in Detail.

By Neha Singh; 19/02/2020; Metro Rail News



Animation for Aerial Ropeway Metro for Dehradun

MUMBAI (Metro Rail News): The MMRDA has floated a tender for the proposed [ropeway project](#) of the corridor-I between Mahavir Nagar metro station on Metro Line-2A (Dahisar to DN Nagar) to Pagoda in Gorai village on the basis of design, finance, build, operate, and transfer (DFBOT). The authority has programmed a pre-bid meeting of interested firms on February 25, 2020, to review the project and assess their suggestions in details.

As per the MMRDA, the length of this ropeway corridor is around 7.2 km and will have 8 stations. It is aimed at providing direct connectivity to villagers living in Gorai and Marve with the Metro Line-2A. Presently, the citizens here have to cross the creek through a ferry boat regularly to take public transport facilities. The implementation of ropeway service will give an alternative **aerial transport mode as last-mile connectivity**.

The metro line-2A is supposed to begin construction work by 2020. So far, around 77.62% of the metro civil work is over.

The state directed in July 2019 the MMRDA to start the work on the ropeway project. The erstwhile BJP govt led by former Chief Minister Devendra Fadnavis had asked the [Indian Port Rail and Ropeway Corporation Limited](#) (IPRCL) to draft a detailed project report.

Reportedly, in the submitted work plan, the IPRCL had cited the efficacy of New York, Columbia and Turkey ropeways, operating successfully and on the same lines, Mumbai also can introduce the ropeway it said.

In a Conversation with Mr. H. K. RAGHU, ED (Urban Transport & High Speed), RDSO; India

By [Neha Singh](#); 24/02/2020; Metro Rail News

Nagpur Metro is looking forward to the Indigenization of 28 different Items costing Rs.13.74 Crores per Train Set.



Mr. H. K. RAGHU, Executive Director Coordination, Urban Transport and High Speed, Research Design & Standards Organisation, Ministry of Railways, Manak Nagar Lucknow, Uttar Pradesh (India)

Metro Rail News Team conducted an Interview of Mr. H. K. RAGHU, ED (Urban Transport & High Speed), RDSO, Lucknow. He talks about his journey and current roles and responsibilities at RDSO, Here are the edited excerpts of the conversation

1. Please let us know about your journey in RDSO? What have been the most challenging projects you have come across in your very eminent experience in Indian Railways?

Mr. H.K. RAGHU: My journey in RDSO has started only from 8 Aug 2019 in the capacity of

Executive Director of Urban Transport and High-Speed Directorate, but my association with RDSO as a Railway Executive is started since 1994 when I was posted in Rail Spring Karkhana Sithauli Gwalior.

2: In the last few years, RDSO has been on a Vendor Development Drive, promoting localization and new suppliers. Can you please share some insights into the same and what are some components for which RDSO is still seeking for new suppliers? Further, what components are you looking for localization for components for metro projects?

Mr. RAGHU: RDSO has made tremendous improvement in its vendor development procedure. Now online vendor approval is done. RDSO is always looking for increasing its vendor base due to ever-increasing demand and change in technologies. All details are available in RDSO official website www.rdsolndianrailways.gov.in

3: As we know that in India, We are aiming for standardization in metro rail systems and currently, 600+ km of metro lines are operational, so please give us some suggestions on how can the standardization be achieved? Additionally, how many km of projects do you foresee will be tendered in India in the next 3 years?

Mr. RAGHU: For Standardization of Metro Systems in INDIA, Ministry of Urban and Housing Affairs, dealing with Urban Transport and mobility, has made the required efforts, by publishing its report “**STANDARDIZATION AND INDIGENIZATION OF METRO RAILWAYS, SYSTEMS AND SUB-SYSTEMS**” in NOVEMBER 2013. After that Delhi Metro Rail Corporation Ltd (DMRC) and other Metros have made further efforts in Indigenization of its components and systems. **DMRC has already indigenized its 18 Subsystem and 17 UNIT EXCHANGE SPARES costing 18.7 Lakh US \$ and 34 Sub Systems costing 3.83 Lakh US \$** are identified for Indigenization.

Nagpur Metro is looking forward to the indigenization of **28 different items** costing **Rs. 13.74 Crores** per train set.

Similarly, other Metro systems are also working for ***Make in INDIA Efforts***, Mumbai Metro Line-3 has finalized its Rolling Stock Tender on M/s Alstom based at Shricity Andhra Pradesh and Pune Metro has given its order of Rolling Stock on Titagarh Firema, based in Kolkatta.

Real standardization and interoperability of the Rolling Stock will be achieved only after the development of its own CBTC Systems in India. DMRC is working on this in

collaboration with M/s BEL for ATC (Supervisor System) in the First stage, after that on the successful implementation of ATC the work on CBTC will be undertaken.

NITI Aayog is giving a lot of emphasis on "***Make in INDIA***" and indigenization of Metro Systems, accordingly policies are framed to support it. as per the recent published NITI Aayog STRATEGY FOR NEW INDIA 2020, there are many incentives to the Indian Industries for achieving Industry 4.0 standards, required for producing Metro systems and Metro Components.

3: Presently, the viability of costly metro rail projects, especially in smaller cities is under review, and the Government is planning to adopt the Metro-Neo and Metro-Lite transit systems. So how do you think that these transit systems can help smaller Indian Cities and also bring convenience to the passengers?

Mr. RAGHU: Metro-Lite and Metro-Neo both the concepts, though new to India, but both exist the world over. While we make this infrastructure in INDIA, we need to keep in mind that operating of these facilities is to be funded by the state to provide better and respectable transport facilities at affordable rates. Here it is pertinent to mention that these facilities need to be energy efficient and preferably green. Metro-neo is less efficient than Metro-Lite, due to pneumatic wheels over the road, having higher friction loss of energy. For saving our climate, we need to look forward to **Hydrogen Fuel Cell Technology**, rather than going for electric energy, which at present is produced in INDIA, through coal energy-based steam thermal power plants, which is less efficient and a major cause of environmental concern. Till we become self-sufficient in energy, we must keep exploring the alternate methods of energy generation, especially for transportation.

4: In terms of PPP Collaboration with the Private Sector, What are the key points which are the most important for a successful collaboration between the Govt. and Private companies?

Mr. RAGHU: Metro is already in PPP mode, Hyderabad and Pune Metro are the example. For Private partnership, this should be taken as one of the Corporate Responsibility The project, rather than looking for profit out of it. For supplying of items related to Metro systems, Private firm need to be Industry 4.0 level, for which NITI Aayog has already given its broad outlines in its report on New INDIA 2020.

5: Any suggestions on how the Passenger experience in metros can be improved in India along with making the projects sustainable for the long term?

Mr. RAGHU: Controlling the crowd per train and increasing the frequency of trains in peak hours, is the need for requirements, with better reliability. Metro stations are to be made **Multy Utility, Commercial Hubs** so that the total cost on metro operation can be compensated, most of the new cities are looking for malls and party joints, this should be clubbed with the metro stations. The basement is to be provided with taxi cab/e-rickshaw facilities for point to point connectivity up to the last mile, in fact, the home itself.

6: Anything you would like to share with our readers?

Mr. RAGHU: Readers need to go through and get them well acquainted with the latest Government policies published through NITI Aayog New India 2020 and Accelerating Vision 2030: India Investment Grid.

Tirumala Tirupati Devasthanams seeks Advice from HMR to start Tirupati – Tirumala Metro-Lite/Monorail; India

By [Neha Singh](#); 26/02/2020; Metro Rail News

On Sunday 23/02/20 Tirumala Tirupati Devasthanams Chairman SV Subba Reddy said they were planning setting up of Light Metro Rail or Monorail between Tirupati to Tirumala..



Venkateswara Temple Tirumala



Artist`s Impression of Light Metro Rail

AMARAVATHI (Metro Rail News): On Sunday 23/02/20 Tirumala Tirupati Devasthanams chairman SV Subba Reddy said they were planning setting up of light metro rail (Metro-Lite) or monorail between Tirupati to Tirumala. He also said they asked a report from the MD of [Hyderabad Metro Rail](#) NVS Reddy and he would hold discussions with Agama Sastra pandits once the report was reached.

While Communicating to media persons, Subba Reddy told they were not planning about rope-based rails and also added that they would only consider the proposals for the metro, mono and tram rail-based transport system. He announced the rail proposal would help them to protect the environment on the hillocks.

Additional he had stumbled upon the idea after observing the linkage of a hill with a monorail in Austria.

Commenting on the publicity being done in the name of National Security Advisor Ajit Doval's Twitter account claiming that TTD had given Rs 2,300 cr of its funds to the State govt, Subba Reddy mentioned their inquiry found that it was a fake account of Ajit Doval. He also warned that they would take strict action upon all those who were indulging in a false campaign toward the TTD Board.

Maha Dy CM wants two-Tier Flyovers on Pune Metro Corridor; India

The Proposal calls for the Flyover and the Metro Flyover to come upon the same existing Pillars, along with the Lines of the double-Decker Flyover moving up at Nal Stop on Karve Road.

By [Neha Singh](#), 18/02/2020; Metro Rail News



PUNE (Metro Rail News): Maharashtra CM Ajit Pawar has directed Pune Metropolitan Regional Development Authority ([PMRDA](#)) to search the possibility of two-tier flyovers, comprising a vehicular thoroughfare and a metro flyover- at three key junctions in the city.

PMRDA is developing the Hinjewadi-Shivajinagar corridor of the [Pune Metro project](#). If executed, the proposal would entail the demolition of the current flyovers at University Chowk, E-Square Chowk and RBI Chowk.

The proposal calls for the flyover and the Metro flyover to come upon the same existing pillars, along with the lines of the double-decker flyover moving up at Nal Stop on Karve Road. Yet, the authorities had deemed the possibility of maintaining the current University flyover and construct the elevated Metro rail line over it.

Sources in the State Government said that with the 2022 deadline for all the Metro lines to become operational, Pawar's fresh directive could cause a delay and also increase the project cost by over Rs 600 crore. "These flyovers were constructed between 2007-10. Their demolition would put a huge burden on the state exchequer," a senior Government official said.

According to the agreement between the project executor and PMRDA signed last September, The date for the financial closure of the project was March-end, within three years of which the project must be completed.

"Demolishing the flyover and re-constructing a two-tier structure would extend the operational period by two more years. This would be a violation of the agreement," a source said.

Meanwhile, transport experts from the city have opposed the Metro lines with flyovers. "Why to give the option of taking out one's private vehicle when there is a Metro line on the same route?" one expert said.

New line's report submitted by the Delhi Metro Rail Corporation (DMRC) the initial project report for the proposed 18 km elevated Shivajinagar-Shewalwadi Metro corridor. PMRDA officials stated DMRC would soon prepare the detailed project report (DPR).

Maha Metro begins Construction on Gaddigodam Multi-Layer Transport System; India

By [Neha Singh](#); 27/02/2020; Metro Rail News

Central Railway recently approved to begin Construction over Railway Land at Gaddigodam. Piling Work has accordingly been commenced. The proposed double-Decker Construction crosses Railway Line at Gaddigodam near Gurudwara on Kamptee Road.



Artist`s Concept for Nagpur Multi-Layer Transport System

NAGPUR (Metro Rail News): Maha Metro has begun the construction work on one of the most ambitious segments of_Maha-Metro Project which includes the development of Flyover and Metro route over the existing road and railway line at Kamptee Road. The structure one of its own kind will create 4 layers transportation mechanism at Gaddigodam, Kamptee Road.

Central Railway recently approved to begin construction over Railway Land at Gaddigodam. Piling work has accordingly been commenced. The proposed double-decker construction crosses Railway Line at Gaddigodam near Gurudwara on Kamptee Road. This is a most complex and challenging project work to be taken out ever, mainly over the ever-busy Railway line and the narrow road at Gaddigodam Railway-under-Bridge.

The structure at Gaddigodam crossing has 4 tier transportation system. The primary level is the surface road level under the current-carrying road traffic; the 2nd level is Railway Track. After the construction is over, the 3rd and 4th levels will be flyover and Metro Rail level respectively. The four-layer structure is the need of the hour considering every busy road and the traffic blockage there.

The way has multiple academic institutions, commercial establishments, banks, govt offices lined up on each side of the road. It also serves a link among northern and southern areas of the city. RBI, Kasturchand Park, Sitabuldi Fort are some of the historic and prominent institutions on the road. The Reach-II section of Nagpur Metro Rail Project, which includes the 4-levels transit system, stretches from Sitabuldi Interchange to Automotive Square Metro Station and is 7.30 km. It consists of 7 stations viz., Zero Mile, Kasturchand Park, Gaddigodam Square, Kadvi Chowk, Indora Chowk, Nari Road and finally Automotive Square station. The double-decker structure on Reach-II section stretches to 5.3 km. The flyover at the third level has four lanes for flyover traffic with every path having a width of 7.50 meters.

Technically, a steel composite truss girder of 1400 MT is to be launched over the Railway tracks by suitable launching method. The steel weight composite truss girder of the 80-meter span is around 1400 MT. The RoB structure consists of pile foundations, piers and portal beams and superstructure is steel composite truss girder of the 80-meter span. The RoB structure height is around 25 meter from road level.

Few of the prominent Features of the Project are as follows:

- The proposed flyover and the metro route share 'Right of Way' – the two structures to be built on a single pillar, thus saving cost and also reducing the usage of road space.
- The fly-over structure would commence from LIC Square and culminate at Automotive Square, both placed on the busy Kamptee Road.
- The 4 levels are i. Kamptee Road, ii. Nagpur-Bhopal Railway Line, iii. Fly-over iv. Metro via-duct.
- The Metro via-duct maximum height would be at Gurdwara at Gaddigodam, where the rail line moves over the road.
- Maximum height of fly-over across the stretch would be at Gaddigodam, where the railway line crosses the road – 14.9 m.
- In the same way, the max height of via-duct across the stretch will be at the same area – Gaddigodam, where the railway line crosses the road – 24.8 m.

Delhi Metro launches 250 new e-Rickshaws at 12 Metro Stations; India

12 more Stations are likely to be added in the next 2-3 Months, wherein around 500 more e-Rickshaws will be put into Service to strengthen the Last Mile Connectivity.

By Narendra Shah; 20/02/2020; Metro Rail News



Delhi Metro Last Mile Initiative; A K Garg, Director (Operations), has flagged off a Fleet of around new 250 e-Rickshaws from Patel Nagar Metro

New Delhi, India (Metro Rail News): In a significant boost to provide last-mile connectivity to metro commuters, Delhi Metro Rail Corporation Limited (DMRC) on Feb 19, 2020, extended the facility of e-rickshaw services to 12 more stations spread across the [Metro Rail Network](#).

With this, the total tally of stations where such facilities available to 29 with an operational fleet of over 1000 e-rickshaws.

To boost last-mile connectivity, Shri AK Garg, Director (Operations), [@OfficialDMRC](#) flagged off e-rickshaw facility for 12 metro stn today from Patel Nagar metro station. Around 250 e-rickshaws will be deployed on the stn spread across yellow, blue, green, violet and magenta lines



These e-rickshaws will be plying from 12 metro stations, i.e. Qutab Minar, Ghittorni, Arjangarh, Nawada, Shadipur, Patel Nagar, Nangloi, Nangloi Railway Station, Govindpuri, Harkesh Nagar Okhla, Moolchand and Botanical Garden between 6.00 am to 11.00 pm every day.

"Till date, to facilitating over one lakh passengers to reach their destinations/stations daily, 800 e-rickshaws being operated from 17 Metro stations. With this addition, the number of e-rickshaws has gone beyond 1,000, covering 29 metro stations," the DMRC said in a statement.

Twelve more stations are likely to be added in the next 2-3 months wherein around 500 more e-rickshaws will be put into service to strengthen the last mile connectivity. These GPS enabled rickshaws called "SmartEs" having covered cabin and full front windscreen, will provide the last mile connectivity within a radius of 3-4 km around Metro stations.

The fares have been kept very nominal at a base price of Rs 10 for the first 2 KM and Rs 5/- for every subsequent KM. The commuters can also book vehicles through the SmartE application and pay digitally for their rides, the official said.

In recent years, DMRC has introduced many [eco-friendly initiatives](#) to ensure a robust last-mile connectivity system, which enables the commuters to prefer non-polluting public transport modes over personal vehicles.

Kolkata East-West Metro resumes Tunnelling at Bowbazar; India

By Neha Singh; 20/02/2020; Metro Rail News

Accepting a Suggestion by IIT-Madras, the Court allowed the Kolkata Metro Rail Corporation, the Executing Agency for the Project, to resume Work between Esplanade and Sealdah Stations in Bowbazar Area of cCentral Kolkata, in Consultation with the Institute.



Kolkata Metro

KOLKATA (Metro Rail News): On Tuesday 18/02/20, the Calcutta High Court allowed the resumption of tunnel-boring work for the Kolkata East-West Metro corridor, which resumed after an aquifer burst in last year August 2019 leading to **severe ground subsidence and the collapse of buildings. Almost 700 residents had to be evacuated after cracks appeared.**

Accepting a suggestion by IIT-Madras, the court allowed the [Kolkata Metro](#) Rail Corporation, the executing agency for the project, to resume work between Esplanade and Sealdah stations in Bowbazar area of central Kolkata, in consultation with the institute. The division bench comprising Chief Justice of Calcutta high court TBN Radhakrishnan and Justice Arijit Banerjee had in September ordered the pause of tunnelling work till further announcement.

3 Months later, the Kolkata Metro Rail Corporation, in view of a report made by its expert committee, moved the court asking its permission to restart the work. On a prayer through an NGO to get the expert committee report vetted by an independent agency, the KMRC then requested IIT-Madras to analyse its findings. The institute report stated that tunnelling work could be continued.

KMRC MD Manas Sarkar stated that this is a new beginning for us. But you could call it a symbolic start. It might take another week for the TBM to burrow steadily. For now, the experts will closely watch how the refurbished machine behaves. They may start it and then stop it again, study the parameters and so on.

Yet, truncated services among Sector-V in Salt Lake to Yuva Bharati Krirangan stadium are scheduled to commence on February 13th 2020.

Kolkata East-West Metro remaining section to be completed in 10 Months; India

By Neha Singh, 22/02/2020; Metro Rail News

Railway Minister Piyush Goyal had said the whole 16.5 km Stretch of the Corridor - from Sector V to Howrah Maidan - is likely to be ready in 2 Yrs. The Kolkata EW Metro Corridor was earlier scheduled to be finished by June



KOLKATA (Metro Rail News): Kolkata East-West metro corridor underground tunnelling work is to take 10 more months to be finished, an international expert committee appointed by the KMRC announced on Friday 22/02/20.

Also, the safety of the people residing in dilapidated buildings – many of that was built over 120 yrs ago - in one part of the route is a cause for concern, Leonard John Endicott said a geotechnical expert and committee head.

“The biggest challenge is that many buildings in the area are in poor condition. Our concern is the safety of the people,” he added further.

“The corridor tunnelling work was postponed after one of the two tunnel boring machines hit an aquifer on August 31, 2019, in Bowbazar area leading to severe ground subsidence and the collapse of buildings, will resume in full swing in a day or two,” said Endicott.

With the TBM getting destroyed beyond repair in the accident, the work will have to be finished with one tunnel boring machines only. The existing TBM has been moved a few rigs to check for all safety parameters put in place to assure that there is no repeat of the earlier incident. “We are super-cautious,” Endicott said.

Earlier to that accident at Bowbazar, two TBMs were working parallelly, boring tunnels for the up and down lines of the East-West Metro corridor. “It will take around five months for the TBM to go up to Sealdah from Bowbazar. Then, it will take three months for the TBM, which is a huge machine, to turn around.

“It will take another two months for the machine to dig on another side and reach up to the point where the first TBM had cut the tunnel,” the geotechnical expert stated. He told that the working TBM had been upgraded and it now has 50% more capacity to assure that the ground holds throughout tunnelling work.

“Special measures have been taken to ensure that water does not seep into the tunnel,” he said that the adding that work will be stopped within 60 minutes of noticing any abnormality throughout tunnelling in the area.

The damaged TBM, which Endicott said is a “write-off”, will be dismantled and carried away from the underground shaft. The Calcutta High Court had allowed restart of tunnel-boring work for the East-West Metro corridor, on February 11.

According to a report by IIT-Madras, the court’s division bench directed the Kolkata Metro Rail Co., the executing agency for the project, to resume operations in Bowbazar, in consultation with the institute. The bench including Chief Justice TBN Radhakrishnan and Justice Arijit Banerjee had ordered a suspension of tunnelling work till further orders, in September last yr.

After three months, the KMRC because of a report made by the expert committee moved the court seeking its permission to restart the works. On a prayer by an NGO to get the expert committee report vetted by an independent agency, the KMRC requested IIT-Madras to analyse its findings. The institute, in its report mentioned that tunnel-boring work could be resumed.

The 4.88 km first phase of the East-West Metro, linking Sector V in Salt Lake with Yuva Bharati Krirangan Stadium begin operational on February 13th 2020. Inaugurating the

operation, Railway Minister Piyush Goyal had said the whole 16.5 km stretch of the corridor – from Sector V to Howrah Maidan – is likely to be ready in 2 yrs. The Kolkata East-West Metro corridor was earlier scheduled to be finished by June 2021.

Delhi – Meerut Regional Semi-High Speed (160 kmph) Rapid Transit Railway Works in full Swing; India

19th Februar 2020; Railway Gazette International



INDIA: The Government of Uttar Pradesh has allocated Rs 9b n for construction of the Delhi – Ghaziabad – Meerut regional express route in the state budget presented on February 18. This follows an allocation of Rs 24·9 bn in the national budget.

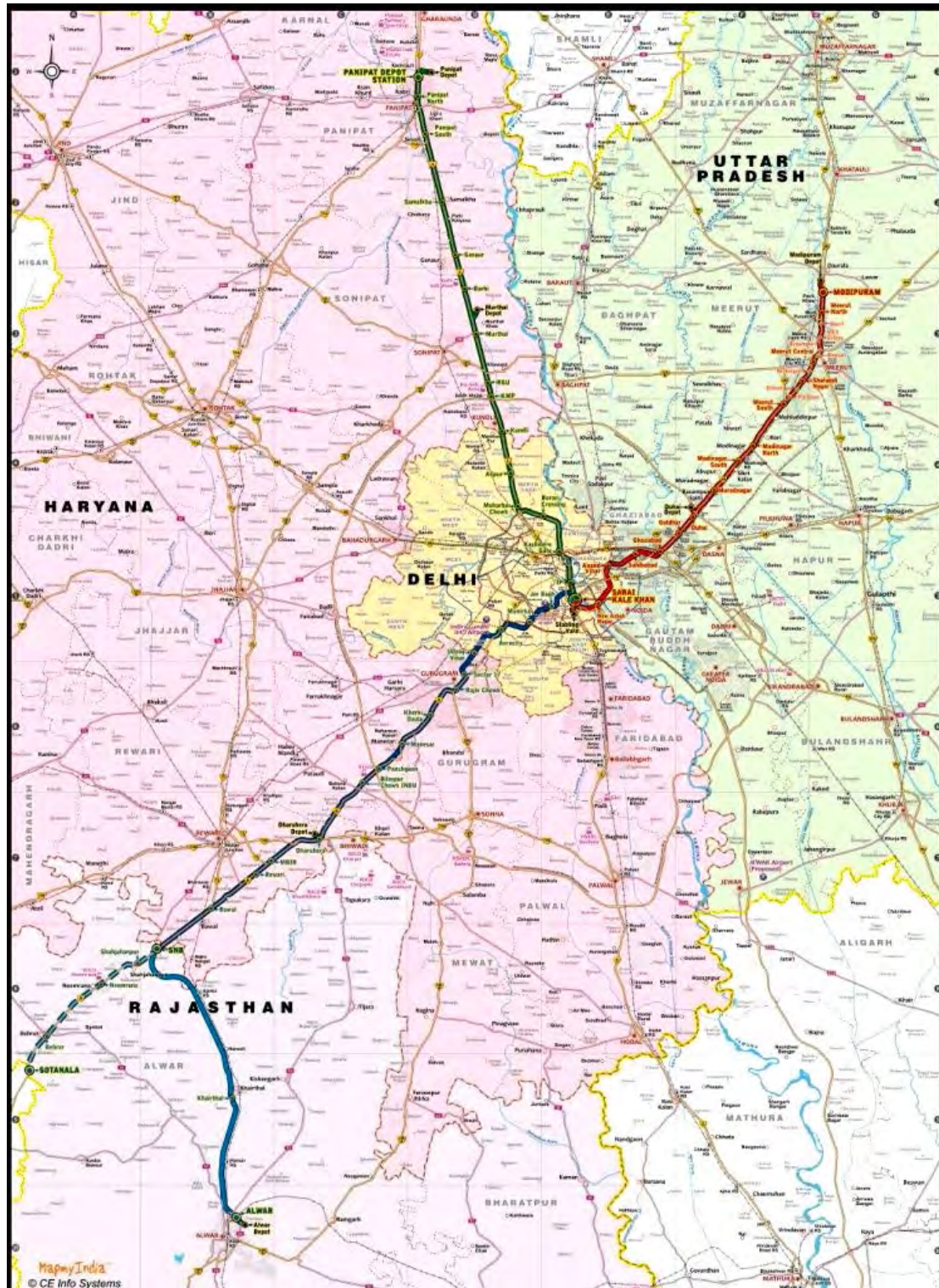
The 82 km line connecting Delhi with satellite towns in the National Capital Region is being designed for a maximum speed of 180 kmph, with 1 676 mm gauge 25 kV AC electric multiple-units running at up to 160 kmph in service to give an end-to-end journey time of under 60 min.

The Regional Rapid Transit System project is being managed by the National Capital Region Transport Corp joint venture of the national government (50%) and the state governments of Haryana, NCT Delhi, Uttar Pradesh and Rajasthan (12.5% each), under the administrative control of the Ministry of Housing & Urban Affairs.

Prime Minister Narendra Modi laid the foundation stone on March 8th 2019. NCRTC said work was now 'in full swing' on the 17 km priority section between Sahibabad, Ghaziabad, Guldhar and Duhai which is scheduled to open in March 2023. Initial works are underway on other sections of the line.

Tenders have been called for preparatory works between Sarai Kale Khan and Anand Vihar, design and boring of the New Ashok Nagar – Sahibabad tunnels and detailed design

of the Sarai Kale Khan – New Ashok Nagar section as well as the depot at Jungpura in New Delhi.



Map of Delhi-Meerut RRTS Corridor

India's 160 kmph Regional Rapid Transit System launched; India

Feb. 26th, 2020; written by [Srinand Jha](#); International Railway Journal

INDIA has officially launched the Regional Rapid Transit System (RRTS) project, which aims to offer 160 kmph services between New Delhi and Tier-2 cities in adjoining states.



First announced in 2005 as part of a strategy to decongest New Delhi and promote industrial, commercial and regional development in the National Capital Region, the Indian government plans to construct eight lines.

Work on three lines – [the 82 km Delhi – Meerut Line](#), the 192 km Delhi – Gurugram – SNB – Alwar line and [the 103 km Delhi – Panipat Line](#) – was prioritised, with civil construction work on the first 17 km of the Delhi – Meerut line now underway at a cost of Rs 302 bn (\$ US 4.2 bn).

The three standard-gauge double-track corridors, which will be ballast-free, will have six depots, serving an estimated 2 million passengers daily. The project will improve operations significantly, with mail and express trains on the routes currently operating at an average of 52 kmph.

Trains will consist of 3.2 m-wide, 22 m-long stainless steel or aluminium coaches, with economy class and one business class coach on each service.

International tenders for the acquisition or manufacture of 210 EMU cars, worth an estimated Rs 20bn, have been launched, and are scheduled to be opened next month. Approximately 30% of the rolling stock will be imported, with the remaining fleet manufactured in India under a transfer of technology arrangement.

The equity structure of the National Capital Region Transport Corporation (NCRTC) is similar to other metro companies, with the Indian government and the regional states holding 50:50 shares of the equity.

“The Indian government may well have approved the project in 2005, but I would not say that it has been delayed,” NCRTC managing director, Mr Vinay Kumar Singh, told IRJ. “It was only in July 2013 that NCRTC was established and I only took over in July 2016. Prime Minister Mr Narendra Modi eventually sanctioned the project in March last year.”

The project has drawn strong interest from global manufacturers. Representatives from Siemens, Alstom, Bombardier, CAF, Mitsubishi and Hyundai-Rotem were among around 40 global companies represented at a pre-bid conference organised by NCRTC.

As a first of its kind project for India, global expertise will be needed from countries that operate similar systems, such as Paris' RER, London's Crossrail, Cercanias in Madrid and regional services in Berlin, Tokyo and Beijing, Singh says.

Around 11km of the Delhi – Ghaziabad – Meerut RRTS will be elevated, while 11.53 km will be underground. The plan also incorporates construction of the Meerut Metro Corridor-I (North-South corridor).

"The Uttar Pradesh government dropped its earlier proposal to construct a separate metro line by deciding to incorporate the plan within the RRTS system," Singh says. "This has resulted in overall cost savings of Rs 63 bn."

Geo-technical investigation and utility diversion works to construct the metro line are at an advanced stage, while work on detailed design and station architecture is in progress.

Patna Metro Corridor 2 Consultancy Contract awarded to AECOM; India

By Narendra Shah; 21/02/2020; Metro Rail News



Artist`s Concept for Patna Metro

Patna, India (Metro Rail News): The joint venture (JV) of AECOM Singapore Pte Limited and AECOM India Pvt. Ltd. emerged as the lowest bidder (L1) for the DDC contract of the corridor 2 of Patna Metro Rail project.

DMRC issued the Letter of Acceptance to the JV of AECOM Singapore Pte Limited and AECOM India Pvt. Ltd for the contract worth Rs 17.27 crore on Feb. 18, 2020.

The scope of work includes providing detail design consultancy (DDC) services for civil, architectural and building services including electrical and mechanical (E&M) works for Corridor 2 of the Patna Metro Rail Project (Phase I). According to the contract, the AECOM has to complete the work in 4 years.

In Nov 2019, the tender was floated by DMRC and the tender value was estimated to Rs 27.50 crore.

The total length of the corridor 2 of Patna Metro will be 17.64 km. Out of 5.67 km will be underground and the remaining 11.97 km will be elevated.

This stretch will connect Patna Railway Station to New inter-state Bus Terminal with a total of 14 metro stations.

CEG Group, Jaipur based firm is currently carried out the soil testing work at 10 locations on the corridor of Patna Metro Rail project.

Delhi Metro Rail Corporation (DMRC) has been appointed as General Consultant for the Patna Metro Rail and given the responsibility to execute the entire phase-I project of Patna Metro.

Civil construction work tenders will be floated after the change of suggested alignment in Metro corridors.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

***OPEN RAIL* - Civil Design Software for Rail Networks by Bentley Systems; Global**



Visualisation with Bentley OPEN RAIL in Metro Rail/Light Rail/Commuter Rail Planning

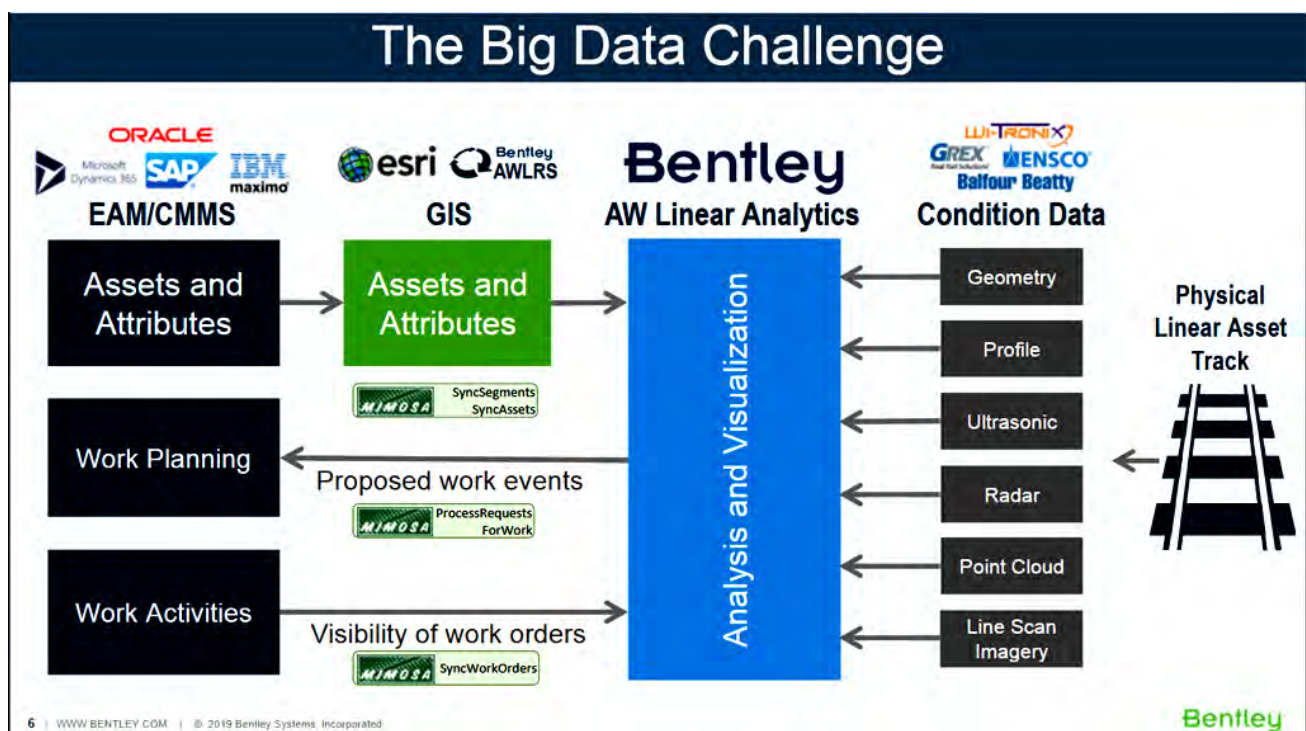
Bentley provides comprehensive track, station, yard, and overhead line electrification design to support all stages of rail design, from concept through construction, maintenance, and operations. **OpenRail** continues to expand on our deep experience in rail design. We offer applications that help redefine best practices for planning, design, and construction deliverables to drive the exchange of information throughout the project delivery lifecycle and across all team participants.

- OpenRail** Concept Station offers rail, electrification, tunnel, and bridge design capabilities, helping rail engineers and designers rapidly determine optimal conceptual designs with real-world data and cost analysis.

- OpenRail** Designer provides comprehensive and detailed modeling of metro rail, light rail, commuter rail or high-speed rail design.

- OpenRail** Overhead Line Designer provides comprehensive and detailed modeling of overhead line and track design. This new application brings 3D to the world of overhead line catenary systems.

Digital Twin represents **Reality Modelling**. **Digital Twins** of Assets support Big Data driven decisions to transform Track Maintenance. Digital Twin is a tool helping to plan maintenance. It is used in supporting workflow for higher productivity.



Benefits

- 1) Understand current asset condition
- 2) Know where to work
- 3) Know what work to do
- 4) Prioritize work
- 5) Review historic work effectiveness
- 6) Extend asset life whilst avoiding run to fail
- 7) Demonstrate competence to operate
- 8) ***Improve safety, reliability and Return on Investment***



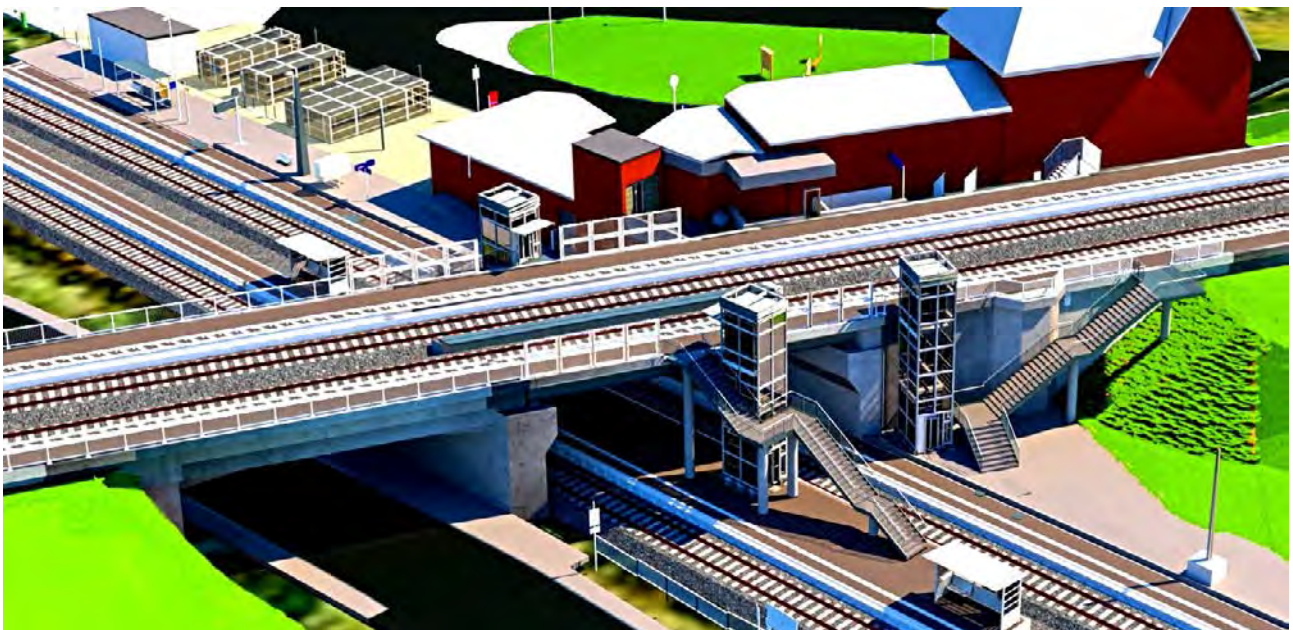
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About Building Information Modelling, BIM; Global

ETR letter 20/02/20

On the topic of Building Information Modeling (short BIM) the rail industry can hardly get past it. Whether infrastructure or vehicles: The new construction planning technology is based on 3D models and is an intelligent process, that digitally provides information and tools to everyone involved - from architects and building contractors to owners and later service providers. These can then be used for efficient planning, design, construction and management of infrastructure.



Sketch for Application of BIM in Railways by German Federal Railway DB

Re-Railing a Metro in a Tunnel; Global; Netherlands

Railway News; published 21th Feb. 2020

Getting a derailed Metro back on its Tracks in a Tunnel is a difficult Job. Commissioned by GVB, Holmatro supplied a lightweight Rerailing System, that offers extra Flexibility in Use.



Holmatro Lightweight Re-Railing System

Situation

The Dutch municipal transportation company GVB provides public transportation in and around Amsterdam. Some 850,000 people use GVB metro, tram or ferry services on a daily basis.

The new Amsterdam metro line 52, also known as the North/South line, was opened in 2018. This metro line runs from Amsterdam North under the old center of the city and through to Amsterdam South. It has a length of 9.7 km, 7.1 of which are underground.

Challenge

Getting a derailed metro or tram back on its tracks is a meticulous and time-consuming job. With the arrival of the North/South line, re-railing a railway vehicle on this line will be an even greater challenge, considering the limited working area in the tunnel section. GVB was looking for a re-railing system that fulfilled their specific requirements of being able to work quickly and safely in the underground part of the North/South line.

Solution

Based on the existing Re-Railing System, Holmatro developed a customer-specific system that is flexible and fits the measurements of the sunken track bed and the limited walking area on both sides of the bed.

An especially lightweight and flexible system was created for GVB by making use of two twin pumps, controlled by two separate control desks. Both 220V pumps are equipped with carrying handles on the frame, which makes it easy for two persons to move it. The control desks are collapsible and therefore take up very little space. Control desk A controls the lifting cylinders as well as the traverse cylinder and is developed for light to normal derailments. Control desk B controls two extra lifting cylinders, which provides more lifting capacity during heavier re-railing jobs. Both control desks can be operated separately or simultaneously. For extra safety, control desk A is equipped with four valves and a selector lever so that the user can never lift and skid at the same time. Extra low and custom-made beams make it possible to easily place the tool in the sunken bed under the metro.

Automated Tram Operation demonstrated in Kraków; Poland

13th February 2020; Metro Report International



POLAND: Kraków City Transport Operator MPK has demonstrated what it said was the first automated operation of a tram in Poland, with no driver in the cab and an onboard computer controlling the speed and when and where the vehicle started, stopped and opened and closed its doors.

The Newag 126N tram carried guests including Mayor Jacek Majchrowski from Muzeum Narodowe to the Cichy Kącik terminus and back on the night of January 27-28.

The automation research project is being undertaken by a partnership of MPK, vehicle manufacturer Newag, Kraków University of Technology, software company Cybid and electronics supplier Medcom.

Satellite location information and distance measurement is used ensure the tram stops in the correct places and obeys speed limits.

The project aims is to develop a system which would assist and supervise drivers, ensuring that trams operate within the required safety parameters, detecting obstructions on the line, intervening in the event of over-speeding and optimising running to ensure a smooth flow of traffic through road junctions.

In the longer term, the fully automated operation of trams in a mixed traffic urban environment is envisaged.

Fast-Charge Battery Development funded; Australia

18th February 2020; Metro Report International



AUSTRALIA: The development of fast-charge lithium-ion batteries to power catenary-free trams is among the projects which have been awarded A\$ 11 m of government funding under a programme to develop the national minerals sector.

The A\$ 5m tram battery project brings together the Commonwealth Scientific & Industrial Research Organisation, University of Queensland, Soluna Australia and Lithium Australia's VSPC subsidiary.

'CSIRO has over 35 years' experience with batteries, and more than 15 years of working in the lithium battery field', said Principal Research Scientist Adam Best. 'We're excited to be applying our significant capabilities and expertise to this project for the design,

manufacture and testing of next-generation fast-charge batteries that incorporate VSPC's advanced cathode materials.'

UQ's Faculty of Engineering, Architecture & IT will provide advanced materials analysis, and Soluna will advise on manufacturing and lead commercialisation.

'Light rail is experiencing a resurgence worldwide as cities modernise, and fast-charge batteries are critical to avoiding the poles and wires of the past', said VSPC Executive Director Mike Vaisey.

Lithium Australia Managing Director Adrian Griffin said the programme aimed 'to deliver an Australian product that puts this country at the forefront of battery development', adding that 'there's more to it than trams; successful application of what is currently at our fingertips will lead to myriad other fast-charge applications, many of them not yet thought of.'

Announcing the latest Co-operative Research Centres Project grants on February 11th, Minister for Industry, Science & Technology Karen Andrews said: 'Value-adding to the critical minerals, which we have in abundance in this country, has obvious economic benefits, but is also essential as we look to scale-up the battery technologies, which can help us transition to new fuel sources'.

Lithium Australia scores \$ 1.6 m to develop "fast Charge" Batteries; Australia

Matt Birney Wednesday, 12th February, 2020 - 15:04

Lithium Australia's 100% owned subsidiary, VSPC, will be part of an expert research team, that will access part of a \$5m Federal Government grant to develop "fast-charging" lithium-ion batteries for use in new generation trams with a view to eliminating overhead power wires.

VSPC, who will receive \$ 1.6 m in its own right, will collaborate with Australia's CSIRO, the University of Queensland and Soluna Australia, all of whom bring lithium-ion battery technology and manufacturing expertise to the table. The funding support is provided under the auspices of Canberra's Co-operative Research Centre Projects.

VSPC will initially focus on developing its advanced battery cathode materials for the project. Contributions from the other collaborators will be 'in-kind'. In particular, VSPC will work with engineers from the University of QLD team on the characterisation and optimisation of VSPC's battery materials as both groups are Brisbane-based.

The project aims to develop a battery technology that can eliminate the need for overhead power lines that are expensive, visually polluting and potentially hazardous, according to Lithium Australia. The CSIRO already has intellectual property relating to "fast charging" lithium-ion batteries with applications in trams and other forms of transport such as e-buses, ferries and even military uses.

VSPC will partner with battery researchers at CSIRO's Clayton Victoria site, to design, manufacture and test fast-charging lithium-ion battery prototypes, that will be created as part of the project. Soluna Australia, a company that is partly owned by [Lithium Australia](#), will advise on the manufacturing and commercialisation of any prototype batteries that are developed.

VSPC has its own pilot plant and R&D facility in Brisbane where it has developed advanced processes for the manufacture of lithium-ion cathode powders applicable to this type of battery technology. The company said its processes can be characterised as simple "nanotechnology" for the production of superior battery cathodes, with low-cost production.

Lithium Australia Managing Director, Adrian Griffin said: "This is an unparalleled opportunity to combine VSPC's battery-materials technology with some of the world's leading research. The aim is to deliver an Australian product that puts this country at the forefront of battery development ... and there's more to it than trams; successful application of what is currently at our fingertips will lead to myriad other fast-charge applications, many of them not yet thought of."

VSPC executive director, Mike Vaisey said: "This project is a tremendous opportunity to bring together Australia's technological capabilities – including VSPC's advanced cathode materials, CSIRO's battery expertise and UQ's analytical abilities – to develop new battery systems using VSPC cathode material. Light rail is experiencing resurgence worldwide as cities modernise, and fast-charge batteries are critical to avoiding the poles and wires of the past."

This project includes a solid suite of battery technologists who know the lithium business well. If successful, the resultant technology could change the face of the tram industry that is increasingly looking like very old technology.

matt.birney@businessnews.com.au

Madrid invests € 35 m in electric Bus Fleet; Spain

20th February 2020; Metro Report International



The latest Version of the Tecnobús Gulliver

SPAIN: Madrid's Municipal Transport Company EMT has put out a €35m tender for the purchase of 50 electric buses.

The winning bidder must deliver all vehicles between September 1 and December 18 of this year.

Describing the contract as 'a firm bet on electric transport as a sustainable mobility strategy', EMT says the tender is the largest bus-related procurement in Madrid's history, and the buses will augment the current 18-strong fleet of 12 m Tecnobús Gulliver electric buses.

Currently, 1 049 of the fleet's 1 900 buses are diesel-fueled.

Bogotá Metro changes Metro and BRT Lines; Colombia

5th February 2020 ; Metro Report International



COLOMBIA: The Mayor of Bogotá Claudia López has announced a new transport plan for the city, including the extension of the future Bogotá Metro's first line and a change of the proposed Transmilenio bus rapid transit route.

The 4.1km metro extension would run from Calle 72 to Calle 100, taking Line 1 to 27 km and 16 stations.

CRRC Changchun is to supply a fleet of driverless trains.

Meanwhile, the Transmilenio BRT route will now connect to the metro on Calle 68, no longer going through Carrera 7th and 72.

The change is meant to provide commuter access to the metro in a convenient location, while not interfering with the planned operations of the Regiotram de Occidente.

The total cost of the project is estimated at \$ 4.3 bn, including a \$480mi loan from the European Investment Bank.

Odense Letbane takes Delivery of its first Tram; Denmark

21th February 2020; Metro Report



Unloading Stadler Variobahn Light Rail Vehicle for Light Rail Line

DENMARK: The first of 16 Stadler Pankow Trams for the Light Rail Line under construction in Odense was delivered on February 20, with Mayor Peter Rahbæk Juel watching the vehicle being unloaded from the lorry which brought it from Berlin.

The Dkr 336 m order for the 29.2 m long, 2 650 mm wide Variobahn Trams weighing 40.8 tonnes was announced in May 2017.

They will be delivered with the exteriors completed, but fitting-out of the interiors will be undertaken at municipal project promoter Odense Letbane's Munkebjergvej depot. Each tram will have 60 seats and a capacity of 193 passengers.

The trams will carry names selected by the public on the theme of 'Travelling is to live', with one named after a local type of cake.

The 14.5 km light rail line is being built at an overall cost of Dkr3bn at 2014 prices, with the opening scheduled for autumn 2021. It will run between Tarup in the northwest of the city, the railway station, Syddansk Universitet, a hospital site and Hjallesø in the south, with 26 stops.

Services are to be operated under a DKr1.2bn 15-year contract awarded to Keolis, which operates the buses in Odense as well as light rail services in Aarhus.

Trams will run every 7½ in the peaks and typically every 15 min off peak, with a maximum speed of 70 kmph and an end-to-end journey time of 42 min. The fare system will be integrated with the buses, and ridership is forecast at 10 to 11 million passengers/year.

Iași orders 16 more Trams; Romania

17th February 2020; Metro Report International



ROMANIA: The Ministry of Regional Development & Public Administration has awarded Polish manufacturer Pesa a € 38.5 m contract to supply 16 trams to the city of Iași on February 5. 2020.

The five-section low-floor Swing 122Na vehicles will be 30.5 m long with a capacity for 239 passengers, 58 seated.

The first trams are expected to enter operations by early 2021. In 2019, Turkish supplier Bozankaya was awarded a contract to supply 16 trams to Iași.

First Śląskie Tram delivered for Katowice; Poland

17th February 2020; Metro Report International



POLAND: Modertrans delivered the first of 10 single-section trams to Tramwaje Śląskie on February 12th 2020.

The low-floor vehicle is one of two bidirectional trams and eight unidirectional ones expected to operate in Katowice by the end of June 2020.

The 29 m złoty contract was co-funded by the EU and signed on March 2018, and it includes options for five more unidirectional trams.

Goiânia on-Demand Minibuses complete first Year; Brazil

20th February 2020; Metro Report International



BRAZIL: Latin America's on-demand shuttle ride service completed a year of operation on February 18th, 2020, having carried 80 000 passengers.

The CityBus 2.0 project launched in Goiás' state capital Goiânia in February 2019 with 15 minibuses covering 11 neighbourhoods, before expanding to a fleet of 40 vehicles with a total coverage zone of 43 km² across 29 districts.

The service is provided by local bus operator HP Transportes Coletivos and US-based Via Transportation, which handles the rideshare apps.

According to Via, the service prevented the release of 58 000 kg of CO₂ in the atmosphere, equivalent to the absorption rate of more than 392 638 adult trees from the Atlantic Forest.

A similar-service was launched in Fortaleza on December 2019 and will debut on Brasília's Distrito Federal in April this year.

METRO NEWSLETTERS

Transport Technologies for “URBAN MOBILITY AS A SERVICE”

**PUBLIC MULTIMODAL URBAN, SUBURBAN, INTERURBAN AND
REGIONAL PASSENGER TRANSIT TECHNOLOGIES FOR URBAN
MOBILITY AS A SERVICE WITH METRO-BUS, BUS RAPID TRANSIT,
LIGHT-RAIL, TRAM-TRAIN, METRO-RAIL, METRO-TRAIN,
COMMUTER-RAIL, MONO-RAIL, AERIAL ROPEWAY, BOTTOM
CABELLINER, MAGLEV AND HOVERCRAFT TRANSIT/PEOPLE MOVER,
WATER-METRO, AUTONOMOUS PEOPLE-MOVER, POD CAR,
SUSPENDED MONO-RAIL METRINO**

**TRANSPORT TECHNOLOGIES AND ECONOMICAL DEVELOPMENTS IN
MODERN URBAN/MEGAPOLIS ENVIROMENT**



**Presentation of Aluminum Body Metro Car for Pune; build by Italian Subsidiary
Titagarh Firema S.P.A. in India; pict.: Symbroj Media Publication**

**METRO 100, March 2020
METRO Newsletter by Dr. F.A. Wingler**

Synopsis:

The activities, developments, evolutions, applications on the field of technologies for urban, suburban, interurban and regional public transport in **India** are part of the **global (worldwide, international)** activities, developments, evolutions, applications.

Metro Rail, Regional Rapid Rail-Transit, Light Metro Rail (Metro-Lite, Light Rail Transit), Commuter Rail, Metro-Neo and Metro-on-Tyres in India are in the context of a comprehensive mobility concept.

In India, the use and application of **Building Information Modelling, Digital Twin, Connected Data Environment, Cloud Based Applications, 3D (4D) Workflows** in **Metro Rail** and in its “faster brother” **Regional Rapid Transit** is rapidly becoming established from planning, engineering, construction to operation and performance – over all live cycle-stages of **METRO RAIL** and **REGIONAL RAPID TRANSIT**. **Digital Twin** supports the management of physical assets and helps in getting the right information to the right people in making better informed decisions. Rail-Transport in India is definitively joining the global **BIG DATA** journey from collection, analysis to predictive use. **Supervisory Control and Data Acquisition, STADA**, gets already applied in Indian Metro Rail Applications.

The knowledge about the benefits and special features of “**METRO-LITE**”/**Light Metro Rail/Light Rail Transit**, the more cost effective “younger sister” of **Metro Rail**, has prevailed in India`s upper echelons and relevant authorities. Worldwide, **Light Metros** or **Light Rail Transits** experience a renaissance. This offers India the opportunity to take part on global evolutions with new cost efficient mobility solutions.

In India we find nowadays high interest for global evolutions in low carbon print propulsion technologies and photovoltaic energy production for electric traction.



BIM Application in Railway Engineering; Source: Deutsche Bahn AG



BIM Application in Metro Rail Engineering



Animation of LRT for Edmonton, Canada



Articulated 9 Car CAF *URBOS*® LRT in Budapest, Hungary



Maha Metro Nagpur uses Metro Station Roof for captive Solar Photovoltaic Power Generation

The feasibility of innovative “**Medium-Speed**” **Maglev Technology** developed by Max Bögl in Germany for public urban transport is being examined in Germany.



Vision of “Medium-Speed” Maglev for Public Urban Transport on Test Rig in South Germany, System: Max Bögl

Topics of the newsletter **METRO 100** are:

I. Indian Activities and Initiatives

- The changing worldwide Dynamic of Urban Transport Business – the Journey towards Digitalisation in India.
- Maharashtra Metro Rail Corporation using Digital Twin Project Management and Workflow System from Bentley for Nagpur Metro Rail.
- Maha Metro likely to save 1552 Crore for Nagpur Metro Project by going Digital.
- Bentley Systems announces the Availability of OpenBuildings Station Designer.
- Patna Metro awarded Traction Consultancy Contract to Systra MVA.
- DMRC appoints Systra MVA to provide Communication Based Train Control Consultancy Services for Line 7 & 8.
- Delhi Metro initiates India’s 1st Metrolite Project.
- BMRCL, Bengaluru, to construct two Metro-Lite Corridors via Public Private Partnership Mode.
- MMRDA, Mumbai, to implement Multi-Modal Integration for Metro Line 2A and 7.
- Kolkata East-West Metro Tunnel Work produced fresh Cracks, Work stalled.
- 21 Residents evacuated from Kolkata Metro Cave-in Zone.
- Residents evacuated at Midnight as Kolkata East-West Route faces new Cracks.
- Kolkata: Midnight Evacuation as Building cracks widen on East-West Route.
- MMRDA, Mumbai, plans mobile App Card to access all Lines.
- Chennai Metro inter-modal Connectivity at Egmore.
- National Capital Region Transport Corporation (NCRTC) to integrate Delhi-Meerut RRTS Corridor with other Modes of Transport.
- Uttar Pradesh Metro Rail Corporation (UPMRC): New Technology to expedite Metro Work.

- CMRL, Chennai, plans to build high rise Building above the elevated Metro Depot.
- Hyderabad Metro, HMRL, beats Hong Kong Metro in Terms of lowest Manpower.
- Hyderabad Metro allows Tickets through Paytm now.
- Lucknow Metro introduces Braille Ticketing.

II. Global Activities

- Bentley Systems announces the Acquisition of GroupBC, UK Leader in Cloud Services for Construction Information Management.
- First Hydrogen Train arrives in the Netherlands.
- Calgary orders 15 Siemens S200 light Rail Vehicles.
- Nairobi Meter Gauge Light Rail Vehicle DMU Deal for Commuter Service signed.
- Austin's Capital Metro gearing up for massive Light Rail System.
- 250 kmph "High-Speed" Regional Rapid Transit Metro proposed in Guangzhou Region.
- Feasibility of "Medium-Speed" Maglev Technology developed by Max Bögl for public urban Transport examined in Germany.
- Barcelona introduces 105 Diesel-Electric Hybrid Buses.

PART I: INDIAN ACTIVITIES AND INITIATIVES FOR URBAN MOBILITY AS A SERVICE

The changing worldwide Dynamic of Urban Transport Business – the Journey towards Digitalisation in India; India

- A Tractate by Dr. F.A. Wingler, Germany, March 2020 -

The activities, developments, evolutions, applications on the field of technologies for urban, suburban, interurban and regional public transport in **India** are part of the **global (worldwide, international)** activities, developments, evolutions, applications.

Like **Metro Rail** in other countries, **Metro Rail in India** is also moving rapidly towards a **Digital Future** with the rise in the use and application of **Digitalisation, Internet of Things, Digital Twins, Artificial Intelligence, Enterprise Resource Planning, Cloud Based Applications, Big Data, Building Information Modelling and Supervisory Control & Data Acquisition**. This evolution is worldwide revolutionising Transits; also in India. Combining edge and **Cloud Computing** with onboard **IoT** platform enables rail operators to consolidate and analyse multiple streams, including visual intelligence and artificial intelligence, potentially paving the way for **Automated Train Operation, ATO. Digitally Twinning** all of the physical assets, from facilities and systems to environments, makes it much easier for engineers and data scientists to gain a deeper understanding of the complete urban transport network.



Remote Condition Monitoring, RCM, using sensor technology to improve condition monitoring, has entered also Indian Rail business market. IoT technology found application in rail for detecting problems with damaged infrastructure before they occur. **On-Line Monitoring of Rolling Stock System, OMRS**, and smart Yards being implemented for Machine assisted automatic Identification of Defects in Rolling Stocks. The Implementation of afore mentioned Technology driven automatic Predictive Maintenance Practices for up-keep of Rolling Stock not only will benefit Indian Railways on Account of efficient and safe Operation of Trains but will also benefit on economic Ground.

As Metro Rails/Urban Transport Technologies become more digitalised and connected over the clouds, they are increasingly susceptible to malicious hacks and **Cyber-Attacks**. Missing awareness is one of the biggest issues in this domain.

The applications of **Building Information Modelling (BIM)**, **Digital 3 D (4D) Modelling and Digital Twin** in Metro Rail to support all stages of design and operation, from concept through planning, construction, maintenance, operation and infrastructure management, are worldwide on the advance. In India **BENTLEY SYSTEMS** is active with its infrastructure and engineering software solutions.

In India, the use and application of **Building Information Modelling, Digital Twin, Connected Data Environment, Cloud Based Applications, 3D (4D) Workflows** in **Metro Rail** and in its "faster brother" **Regional Rapid Transit** is rapidly becoming established from planning, engineering, construction to operation and performance – over all live cycle-stages of **METRO RAIL** and **REGIONAL RAPID TRANSIT**. **Digital Twin** supports the management of physical assets and helps in getting the right information to the right people in making better informed decisions. Rail-Transport in India is definitively joining the global **BIG DATA** journey from collection, analysis to predictive use. **Supervisory Control and Data Acquisition, STADA**, gets already applied in Indian Metro Rail Applications.

Maharashtra Metro Rail Corporation using Digital Twin Project Management and Workflow System from Bentley for Nagpur Metro Rail; India

Excerpts from Eisenbahn Ingenieur, EI, (DVG Media Group GmbH) 03. March 2020, p. 30;
Author: Meg Davis, Bentley Systems

Maharashtra Metro Rail Corporation Limited is using the digital Project Management and Workflow Systems from Bentley for Nagpur Metro Rail in every Phase of the Metro Rail System's Life Cycle Stages, from Planning, Construction and Maintenance to Operation and Performance.



Digital Twin of Nagpur Ujwal Nagar Metro Station; Maharashtra Metro Rail Corporation Limited



Digital Twin of Nagpur Multi-Layer Metro/Road Lines

Digital Twins are one of the most discussed issues since they have the potential to upgrade innovations of designs, for visual improvement cooperation as well as increase reliability and performance of plants. The railway is one very traditional and security conscious Industry, however, many plant operators have around the world the potential for digital twins recognized in their work, and they started using the options of big data analysis, artificial intelligence (AI) and machine learning (ML) planning, construction, operation and maintenance of railway and urban transport networks to explore.

A digital twin is the digital representation a physical system, a process or a system and the technical information we use to understand, performance and model. Expressed in a simple way, a digital twin is a high detailed digital model, that forms the counterpart ("Twin") to a physical asset. This system can be anything: From a ticket machines or an escalator in a metro station over the track and the switches and crossings in it, the associated infrastructure such as overpasses or catenaries up to an entire metro station or an entire city.

Networked devices and sensors on the physical plant collect data about, for example of condition or performance. Information based on the digital twin can be mapped to understand on the one hand how the physical plant in the real world works, and on the other hand through analysis or simulation to recognize how they will behave in the future or how they could work with another set of parameters. The technology of digital twins have existed in industries for many years in manufacturing, where they have contributed in process advances, in optimizing of performance and components, that are at risk of failure.

The relevance and influence of digital twins encompassing the entire plant life cycle, are crucial for the railway and metro rail infrastructure. In the planning, designing and building a new metro rail or in major modernization, digital twins at one project optimizing, can influence the design accordingly the operational requirements, and they can enable to reduce the risk of delayed or non-compliant construction.

Digital twins help in logistics and in improving communication within the supply chain. This helps to adhere to the schedules and budgets.

Maharashtra Metro Rail Corporation Limited is using the digital project management and workflow systems from Bentley for Nagpur Metro Rail in every phase of the Metro Rail System's life cycle stages, from planning, construction and operation to performance. Maharashtra Metro Rail Corporation is using the digital project-management system with Connected Data Environment, CDE, from the Bentley's *Open-Rail* workflow tool; see also newsletter **METRO 99**.

Hundreds of thousands drawings and documents are edited within the Connected Data Environment, CDE, to be currently used by about 400 users with trustworthy real time access.

Maha Metro likely to save 1552 Crore for Nagpur Metro Project by going Digital; India

By Narendra Shah: 26/04/2019; Metro Rail News



NAGPUR (Metro Rail News): Maharashtra Metro Rail Corporation Limited (Maha Metro) likely to save up to 1552 Crore over the next 25 years after installing a **digital management platform** created by US-based Bentley Systems

Maha Metro building 41.7 km long Nagpur Metro project, which includes 40 stations and two depots to provide a safe, reliable, efficient, affordable, commuter-friendly and environmentally-sustainable rapid public transport system for the region.

According to a study conducted by the Ministry of Statistics and Program Implementation, GOI found Out of 564 infrastructure initiatives rolled out in India, 42% faced delay and 31% had no definite delivery date.

To avoid any cost or delay difficulties, Maha Metro and software developer Bentley Systems have collaborated to create a **Building Information Modelling (BIM)** academy. This encourages the adoption of a **Connected Data Environment (CDE)** and compliance with Bim.

Maha Metro has also adopted **Bentley Systems' Open Rail CDE** software. This digital platform now holds 12,000 3D models, drawings, and project documents.

For the 22 design consultants and 15 contractors working on Nagpur Metro, it provides an ongoing source of information to ensure the project stays on track and on budget.

Anticipated savings because of Maha Metro's adoption of OpenRail CDE and this pioneering approach for the Indian rail market during design and construction include:

- USD 540,000 during design review for distribution and review of information compared to manual processes.
- USD 280,000 through its adoption of automated CAD quality assurance and title block integration.
- USD 690,000 because of on-site validation of documents using QR codes.
- USD 85,000 by way of dynamic dashboard project progress reports.

Maha Metro also has its eye on operational expenditure during the capital expenditure phase and has configured its CDE to record all engineered components, systems, locations, properties, specifications, and drawings. The CDE also helped Maha Metro procure vendor data, vendor manual, vendor drawings, bills of materials, and specifications. Lastly, through the CDE, Maha Metro could install or construct assets, including test data and inspection reports, that cover all of the lifecycle stages.

When completed, this trusted source of information residing in the CDE will form the operational backbone of Nagpur Metro's infrastructure for years to come, and it is expected to generate savings of around USD 222 million over a 25-year period.

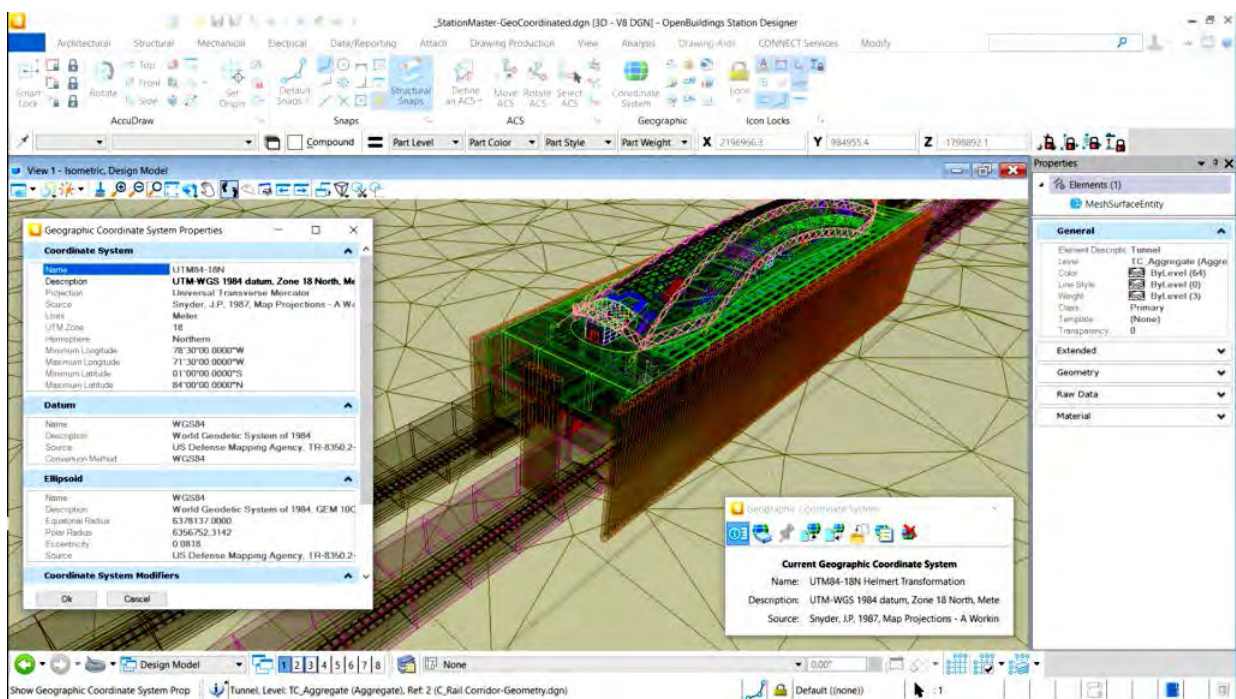
"We are happy that we chose Bentley as the partner to realize our digital project management approach in successfully executing our project from concept to operations. The team's innovative use of Bentley technology to manage the design, construction and handover has already been acknowledged by other large infrastructure owner-operators as an important first step to introducing a new culture for delivering rail projects in India," said Brijesh Kumar Dixit, Managing Director, Maharashtra Metro Rail Corporation Limited.

Bentley Systems announces the Availability of OpenBuildings Station Designer; India

May 21th, 2019; Press Release; Rail Analysis India



Bentley Systems, Incorporated, the leading global provider of comprehensive software and digital twins services for advancing the design, construction, and operations of infrastructure, today announced the general availability of ***OpenBuildings Station Designer***, a new multidisciplinary application for the design, analysis, visualization, and simulation of new or operating rail, metro or other transit stations. Advancing beyond generic BIM applications, ***OpenBuildings Station Designer*** was developed specifically for rail and transit station modeling, with asset-specific content and workflows. ***OpenBuildings Station Designer*** streamlines and automates design collaboration design between architectural, mechanical, electrical, and structural disciplines sharing modeling, clash resolution, and documentation capabilities.



OpenBuildings Station Designer streamlines multidisciplinary design between architects and mechanical, electrical, and structural engineers with a shared set of modeling, clash resolution, and documentation capabilities.

OpenBuildings Station Designer incorporates **LEGION**, the industry leading simulation software, acquired by Bentley late in 2018, for fully modeling pedestrian traffic to optimize footfall, wayfinding, crowd management, safety, and security. With the integrated capability to model and simulate pedestrian scenarios, *OpenBuildings Station Designer* helps designers to improve the functional use of space, passenger throughput, and the pedestrian experience.

By virtue of Bentley's open modeling environment, *OpenBuildings Station Designer* enables iterative digital workflows spanning *OpenRail* and *OpenRoads* to assure comprehensive and coordinated engineering modeling of transportation assets and modes. Within Bentley's **OpenRail Connected Data Environment (CDE)**, the *Components Center* cloud service contributes to station project quality and integrity through pre-populated digital components, which include signaling equipment, escalators, turnstiles, public address systems, signage, kiosks, and more.



OpenBuildings Station Designer incorporates LEGION Model Builder, Bentley's leading Application for fully Modeling Pedestrian traffic

Open Buildings Station Designer breaks down barriers among stakeholders and increases the value and fitness-for-purpose of design deliverables through its:

- included *LEGION* pedestrian simulation;
- integration with *OpenRail* for rail design;
- integration with *OpenRoads* for roads design;
- clash resolution;
- multi-discipline documentation;
- ready-to-use catalogs for functional spaces and equipment and
- enlivened visualizations.

Santanu Das, SVP for Bentley's design integration business unit, said, "OpenBuildings Station Designer reflects our goal of advancing BIM through digital twins, by including within its multi-discipline design scope the integral simulation of pedestrian traffic outcomes. With such insight, the designer can anticipate pedestrian bottlenecks and modify the layout to improve the station efficiency and safety, ultimately improving the passenger experience. Accordingly, we expect OpenBuildings Station Designer to also benefit existing rail and transit stations for renovations and upgrades, increasing their capacity and throughput."



OpenBuildings Station Designer helps Designers improve the Quality of Station and Facility Design and optimize the functional Use of Space and the Pedestrian Experience

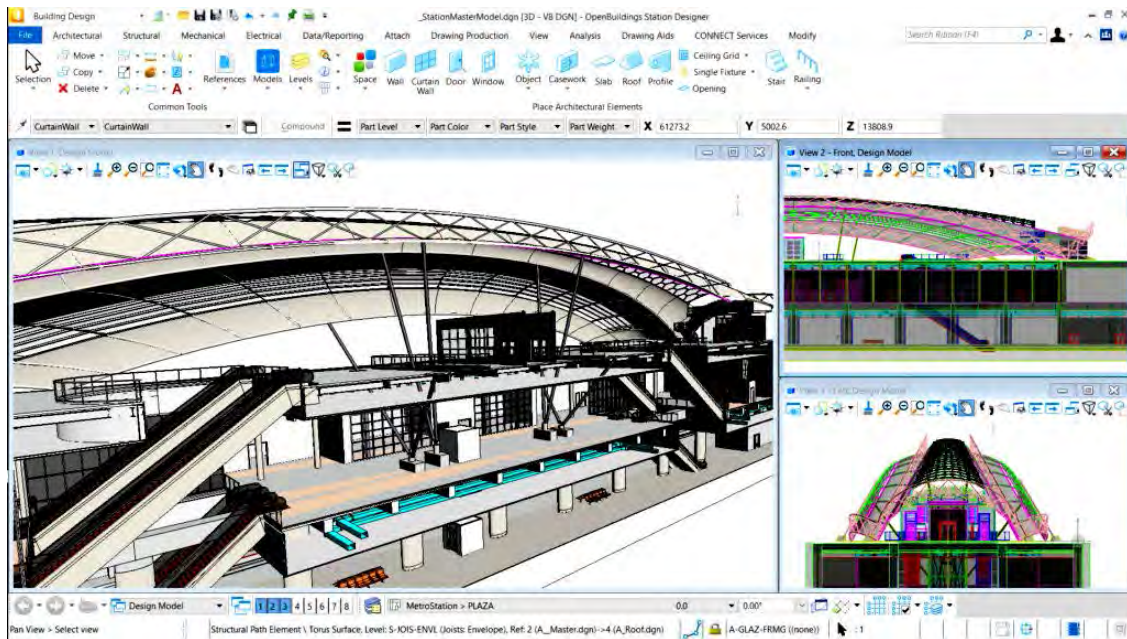
Mike Nicholson, associate for Steer Group, said, "For over a decade Steer has successfully been delivering a wide range of pedestrian modeling studies around the world utilizing LEGION. We are now looking forward to using the full BIM capabilities of *OpenBuildings Station Designer*."

More about OpenBuildings Station Designer

About Bentley's Open Modeling Environment

Sharing digital components through *Components Center* and connecting automated and iterative digital workflows across disciplines for design integration are the foundation of Bentley's *open modeling environment*. Bentley's open modeling applications are also "open" to analytics and simulation from among Bentley's portfolio of analysis tools including *RAM*, *STAAD*, *PLAXIS*, *LEGION*, *LEAP*, *SITEOPS*, and *AutoPIPE*.

Comprising *MicroStation*-based engineering and BIM applications specialized for asset types and solutions, the open modeling environment advances collaboration, enabling clash resolution and production of multidiscipline deliverables from any application. Bentley's growing list of open modeling applications include *OpenBuildings*, *OpenPlant*, *OpenRoads*, *OpenRail*, *OpenBridge*, *OpenSite*, *OpenFlows*, and *OpenUtilities*.



***OpenBuildings Station Designer* was developed specifically for Rail and Transit Station Design, with Asset-specific Content and Workflows**

About Bentley Systems

Bentley Systems is the leading global provider of software solutions to engineers, architects, geospatial professionals, constructors, and owner-operators for the design, construction, and operations of infrastructure. Bentley's *MicroStation*-based engineering and BIM applications, and its digital twin cloud services, advance the project delivery (*ProjectWise*) and the asset performance (*AssetWise*) of transportation and other public works, utilities, industrial and resources plants, and commercial and institutional facilities.

Bentley Systems employs more than 3,500 colleagues, generates annual revenues of over \$700 million in 170 countries, and has invested more than \$1 billion in research, development, and acquisitions since 2014. From inception in 1984, the company has remained majority-owned by its five founding Bentley brothers. Bentley shares transact by invitation on the NASDAQ Private Market. www.bentley.com.

Patna Metro awarded Traction Consultancy Contract to Systra MVA; India, France

By Neha Singh; 11/03/2020; Metro Rail News

Systra MVA and Ardanuy Ingeniera SA-Ardanuy India Joint Venture only 2 Bidders had bids submitted against the expected Cost of work Rs 4.36 cr by the DMRC.



PATNA (Metro Rail News): Systra MVA, the French consultancy firm, has appeared as a single qualified bidder for the DDC (Detailed Design Consultancy) services for the 25 kV OHE system, traction & power supply, and SCADA system for [Patna Metro](#) phase-1 project.

Systra MVA and Ardanuy Ingeniera SA-Ardanuy India Joint Venture, only 2 bidders had bids submitted against the expected cost of work Rs 4.36 cr by the DMRC. SYSTRA MVA Consulting Pvt Ltd has quoted Rs 1.44 cr and bagged the contract as the quoted charge was found 44% lower than the expected cost of the contract. Moreover the 2nd bidder Ardanuy Ingeniera SA-Ardanuy India Joint Venture was not technically qualified so its financial bid not initiated.

The scope of work includes DDC for Design of 25 kV Overhead Equipment system for Elevated Line, Power Supply and SCADA for both Underground and Elevated Lines comprising checking of Design of Receiving Substations and Design Validation of 2 Corridors of Patna Metro project. The firm has to finish the work in 3 years.

DDC tender for the above traction consultancy operation was floated this year in January and technical bids were initiated on 18th Feb 2020 and subsequently, the financial bid was initiated on March-4 2020. DMRC has awarded consultancy contract to AECOM for giving four years DDC services for civil, architectural and building services comprising electrical and mechanical works for Corridor first and second of the Patna Metro [Phase-1 project](#), last month.

Tender of construction work would be floated by Delhi Metro Rail Corporation after finalising the revised alignment of the north-south corridors of Patna Metro phase-1. CEG Group, that is Jaipur based, is conducting geotechnical and soil testing at many locations on the proposed routes of corridors of the project. Patna Metro Phase-1 project consists of 2 corridors with an entire length of 30.91 km.

DMRC appoints Systra MVA to provide Communication Based Train Control Consultancy Services for Line 7 & 8; India

By Neha Singh; 11/03/2020; Metro Rail News

The DMRC has appointed Systra MVA for providing CBTC Consultancy Services for the Construction Work of Metro Pink Line(7) & Magenta Line(8) of Delhi Metro Rail Network. Delhi Metro would be the 1st Metro Rail Operator to introduce like Unattended Train Operation (UTO) in India.



NEW DELHI (Metro Rail News): DMRC has appointed Systra MVA for providing CBTC consultancy services for the construction work of Metro Pink Line(7) and Magenta Line(8) of Delhi Metro rail network.

DMRC had uncovered its plan in August 2019 to switch to driverless train operations on Line 7 & 8 from May 2020 by using a state-of-the-art signalling technology termed as communication-based train control. Shortly, DMRC is running an overall 81 6-coaches 'RS10' trains provided by the consortium of Hyundai Rotem and BEML Ltd. on both corridors. However, the signalling system was provided by Bombardier and Nippon for both Line 7 & 8 respectively.

DMRC has floated a tender to execute the plan last year in August for engagement of Consultant for inspection & review of several Systems with regard to implementation of UTO work in Line 7 and 8 of Delhi Metro network Phase-III. Only Systra MVA has submitted their proposal to give the aforesaid consultancy services at a complete cost of approx regarding the tender notice.

Rs 21.16 cr with tax. The firm has quoted Rs 21,15,58,841.00 against the expected expense of operation Rs 8.55 cr by DMRC which is around 2.5 times the expected value of the work. Systra MVA proposal has been approved by the Tender Appraisal Committee of Delhi Metro Rail Corporation on 8th Jan and the financial bids were opened on the same day.

The trains on Line 7 & 8 is being operated in GOA2 mode since Feb 2018. As per the DMRC the Rolling Stock, Signalling, Traction, Track & Depot design are compliant for work in GOA 4 mode. Testing and Commissioning for UTO are continuing and the tentative target for work in GOA 3 is set for May 2020.

In the contract terms, Systra MVA will guide and provide basic valuable inputs, assist in the framing of many procedure orders pertaining to ATO/UTO and study of many systems as Operation Control Centre, Maintenance, Traction & OHE system, Power, Stabling Yard,

Depot infrastructure, Operation, Rolling Stock, Permanent Way and Signalling for the overall implementation of ATO/UTO.

Further, Systra MVA will also study the current multiple systems, evaluate and suggest system-wise growth measures that are essential for the implementation of ATO/UTO, in accordance with international norms/global practice. Earlier implemented, [Delhi Metro](#) would be the 1st Metro Rail Operator to introduce like **Unattended Train Operation (UTO)** in India.

Delhi Metro initiates India's 1st Metro-Lite Project; India

By Neha Singh; 13/03/2020; Metro Rail

Tenders have been floated for the Acquisition of 29 Trains for the Distance of 19 km upcoming Metro Lite Project. The Project stretches between Kirti Nagar in West Delhi and Bamnoli in south-west Delhi.



CAF *URBOS*® Tram in Canberra, Australia

NEW DELHI (Metro Rail News): DMRC initiates [India's first Metro-Lite Project](#). Newly, the Delhi Metro Rail Corporation has floated tenders for the upcoming Metrolite corridor between Kirti Nagar-Bamnoli in Delhi. A DMRC spokesperson stated that tenders have been floated for the acquisition of 29 trains for the distance of 19 km upcoming Metro-Lite project. The project stretches between Kirti Nagar in West Delhi and Bamnoli in south-west Delhi. The spokesperson further added that as of now the tenders have been floated for the acquisition for the rolling stock of the project and not for civil work.

As per the DMRC, once the contract is given the contractor would have to give the Metrolite trains within 18 months. This would be the very 1st Metro-Lite corridor in the Country. The previous year Union Minister of Housing and Urban Affairs Hardeep Singh

Puri had declared the plan to develop 2 Metro-Lite corridors in Delhi- 1 between Rithala and Narela and another between Kirti Nagar and Bamnoli. The Metro-Lite trains would be smaller in size as compared to the Delhi Metro coaches and the track would be of standard gauge.

Details of Kirti Nagar-Bamnoli Metro-Lite Project

- The Kirti Nagar & Bamnoli corridor would be totally at-grade and will run along the arterial roads in Mayapuri industrial region, Hari Nagar, Shivpuri, Dwarka sectors 1,2,6,7,10, 20, 23, 24 areas before terminating at Bamnoli village
- It will also pass via Dwarka sector 25, where there is an under-construction exhibition-cum-convention centre.
- Each Metro-Lite train would have 7 AC coaches and every train will have a capacity of accommodating as much as 425 commuters.
- Metro-Lite trains length will be 45 m. The Delhi Metro trains are 89-178 m long.
- The running speed of the Metro-Lite has been proposed at 60 kmph.
- The ticketing system for the Metro-Lite is yet to be settled, as per the DMRC.

BMRCL, Bengaluru, to construct two Metro-Lite Corridors via Public Private Partnership Mode; India

By [Neha Singh](#); 07/03/2020; Metro Rail News

Karnataka Chief Minister BS Yediyurappa declared in his Budget Speech that the outer Ring Road-West Metro and Magadi Road-Metro-Lite Line will be developed by a public-private Partnership (PPP).



CAF "URBOS 3[®]", Overhead Catenary free Battery City LRV at Zaragoza, Spain; delineating Image for Bangalore Metro-Lite; Source: Rail UK

BENGALURU (Metro Rail News): Karnataka Chief Minister BS Yediyurappa declared in his budget speech that the **outer Ring Road-West Metro** and Magadi Road-[Metrolite](#) corridor will be developed by a public-private partnership (PPP). The outer Ring Road Metro project would connect Hebbal and JP Nagar it will help to ease traffic congestion on **outer Ring Road (ORR)**.

The public-private model has been proposed the first time for a Metro rail project in the city. Till now, Bangalore Metro Rail Corporation Ltd has handled the works through connecting contractors. Following the proposed model an eligible private company can develop and run Metro systems.

The [Delhi airport Metro line](#) and segments of [Hyderabad–Mumbai Metro](#) were built following this model. "The preparation of the DPR for ORR-West Metro and Magadi Road **Metrolite** will be taken up; it is proposed to be implemented by a public-private partnership," Yediyurappa stated during unveiling his budget proposals.

As per BMRCL officials, the project report for the 30-kilometre ORR-West line and 14 kilometre Magadi Road Metro-Lite would be drawn up in some months. Metro rail projects are usually funded by central and state govt. with loans from financial institutions. "Whether private firms will entirely build, operate and maintain Metro systems would be decided based on a project's financial viability and ridership estimation," said a BMRCL official.

Just like a monorail, the Metro-Lite is a transit system with smaller coaches. It is more affordable than the regular Metro Rail. "The construction work of the 56km long line from Central Silk Board to Kempegowda International Airport through KR Puram and Hebbal at an expected cost of Rs 14,500 Cr will begin in 2020-21," stated Yediyurappa.

The CM added that Mysuru Road-Kengeri and Yelechenahalli-Anjanapura township corridors will be commissioned this year. Road cross-over conveniences for non-Metro passengers would be presented at 24 metro stations.

In the budget, there was an important focus on public transport. "Public transport systems require to be strengthened and extended in terms of reducing traffic density in Bengaluru," said Yediyurappa. He declared that Rs 500 Cr. will be earmarked for the long-pending Bengaluru suburban rail project in 2020-21.

However, the project is awaited to cost Rs 18,000 Cr., is still waiting to be confirmed by the central cabinet committee on economic affairs. "This project will be a major step in the way of developing a public transport system in Bengaluru," he added.

The State Government has also chosen to shoulder 50% of the project expense for the doubling of Byappanahalli-Hosur and Yeshwantpur-Channasandra rail tracks. It had insisted first on 20:20 model with the railways, stating the left 60% of the funding requirement should be filled by loans.

The Government will provide Rs 100 Cr. per year for a 7-year period in the terms of loan subsidy to bus operator BMTC so that it can purchase 1,500 diesel buses at a cost of Rs 600 cr. In addition to this, a reward of Rs 100 Cr has been allowed for the addition of 500 ordinary electric buses for BMTC's fleet.

To reduce the traffic congestion there are also various steps will also be taken in Hebbal, Silk Board and KR Puram junctions. "Infrastructure facilities, transit-based development and essential regulatory measures will ensure that the utilisation of public transport increases from 48%-73%," he replied.

MMRDA, Mumbai, to implement Multi-Modal Integration for Metro Line 2A and 7; India

March 5, 2020 Rail News



The Mumbai Metropolitan Region Development Authority (MMRDA) has planned to develop Multi-Modal Integration (MMI) facilities for the metro line 2A and 7. The two [metro](#) lines are expected to be operational by December 2020.

More Information:

- The [construction](#) work of Line 2 (now Yellow Line) and Line 7 (now Red Line) are on advance stages of completion.
- These metro lines will get MMI first and other Metro lines will follow suit subsequently.
- **Adding multi-modal integration to key metro stations will improve connectivity, particularly since most Metro Lines are situated near commercial or residential areas.**
- Already, the MMRDA has called tenders for contractors and project management consultants to assist with the multi-modal integration on Metro lines.
- The MMI will be split into multiple packages for the contractors.
- Packages 1 and 2 will be reserved for 8 stations, while the tender costs have been set at Rs 82.55 crore and Rs 98.15 crore respectively.
- Packages 3 and 4 will cover 7 stations at a tender cost of Rs 91.04 crore and Rs 85.12 crore.

Kolkata East-West Metro Tunnel Work produced fresh Cracks, Work stalled; India

By [Neha Singh](#); 02/03/2020; Metro Rail News

Sources declared the Tunnel-Boring Machine will remain closed till Saturday. The engineers will investigate the Buildings in the Lane to figure out whether the Cracks were growing.



KOLKATA (Metro Rail News): On Friday, Kolkata East-West Metro [tunnel-boring work](#) was stopped after some hours when fresh cracks were spotted on some buildings in Chaitan Sen Lane in Bowbazar. The lane is nearby Gour De Lane where several buildings had [caught cracks](#) or subsided after a tunnel-boring machine had hit an aquifer in August. The accident led to the suspension of East-West work for almost 6 months.

Sources declared the tunnel-boring machine will remain closed till Saturday. The engineers will investigate the buildings in the lane to figure out whether the cracks were growing. "If the cracks do not grow and fresh cracks do not appear the tunnel-boring machine will resume work on Sunday," stated an official of KMRC, the implementing agency of the project.

The total distance of 16.5 km East-West Metro will connect Salt Lake Sector V and Howrah Maidan through a stretch under the ideal Hooghly river. A group of Kolkata Metro engineers visited Chaitan Sen Lane and talked to residents on Friday, trying to help in their fears. Crack-meters have been installed and residents were convinced that the new cracks will not affect the buildings.

"The cracks are very thin and they won't cause the buildings to collapse," an engineer stated while talking to the residents of the lane in the afternoon. "Some of the cracks have developed after the tunnel-boring machine crossed this part of the lane."

Kolkata Metro Rail Corporation had evicted some families from Chaitan Sen Lane before the machine continued work a few days ago. Engineers told there was no need for further evacuation.

21 Residents evacuated from Kolkata Metro Cave-in Zone; India

KMRC, the Agency executing the Kolkata East-West Metro Project, had commenced Evacuation on Sunday by shifting twelve Residents.

By Neha Singh; 05/03/2020; Metro Rail News



KOLKATA (Metro Rail News): As tunnel-boring machine Urvi went into the cave-in zone on Tuesday 04/03/2020, a total of 21 residents from Gour De Lane off Bowbazar were evacuated. The range of subsidence that found out the buildings fall like a pack of cards begins here. KMRC, the agency executing the Kolkata East-West Metro Project, had commenced evacuation on Sunday by shifting twelve residents.

Kolkata Metro Rail is extremely cautious this time. Nobody wants a repeat of 31st August 2019, when the TBM digging the westbound tunnel of the Kolkata Metro project hit an aquifer and water flooded the tunnel, bringing with it sand and soil. Several buildings had fallen and many others were damaged in the subsidence, that could be arrested only after twelve days. "On that time, our house was destroyed even though the TBM was digging at a distance. This time, the tunnelling will be carried out right below our building. We all are extremely worried," stated Suneet Sarkar of 4B, Gour De Lane.

The Durga Pithuri Lane and Shyrapara Lane were the worst-hit. Buildings of Gour De Lane nearby Shyrapara Lane were also affected. "The last time we had to wait in a hotel for around 28 days. When we got back, found some cracks in the walls of the house," the 68-year-old told. "The Kolkata Metro Rail Co. notice tells we can return on Sunday but so many people haven't been able to return on the scheduled date. The tunnelling we were said, is slow and hence the delay," Sarkar said.

Although 5 homes can be evacuated Somnath Banerjee of 2B Gour De Lane denied to leave his house. "I shall not move until my nephew gets the Rs five lakh compensation. He denies to pay the electric bills and house tax because I got the money and he didn't," said Banerjee.

Urvi's twin Chundee which hit the aquifer is presently lying defunct below Durga Pithuri Lane. It was building the westbound tunnel. Urvi was building the east-bound tunnel also had dug till the Nirmal Chunder Street-Chaitan Sen Lane crossing at the same time of the tunnelling fiasco and had been stuck ever since.

As per a Calcutta high-court order to continue tunnelling works, it continued digging on Feb 18th 2020. It has made around 1,100 rings till now. As the TBM burrows an industrial robot places segments of a 1.2 meter extended pre-cast concrete ring. And thus a 12 meter stretch of the tunnel gets built regularly. But thanks to Urvi's slow progress, only around 100 meter has been covered in the last fortnight.

Residents evacuated at Midnight as Kolkata East-West Route faces new Cracks; India

On Thursday 36 Bowbazar Residents were evacuated after Midnight as new Cracks, that had surfaced the past Day on their House at 5/2 Gour De Lane, began widening..

By Neha Singh; 14/03/2020; Metro Rail News



KOLKATA (Metro Rail News): On Thursday 12/03/20 36 Bowbazar residents were evacuated and relocated after midnight as cracks, that had surfaced the past day on their house at 5/2 Gour De Lane, began widening.

Gour De Lane is in the zone where buildings fell after one of the tunnel boring machines digging the [East-West Metro tunnel](#) hit an aquifer previous year leading to large-scale subsidence. KMRC implementing agency of the project, however, ruled out again on the August 31 disaster regarding the host of precautionary measures they have selected for the 2nd phase of tunnelling.

Kolkata residents panicked but as buildings along with the narrow bylane off Bowbazar formed cracks in the last 36-hrs. Crack meter readings on the terrace of 5/2 Gour De Lane showed that fissures had increased around 4 times from, on Wednesday 4.5mm-16mm on Thursday.

One of the owners Tiloki Kesari took a round of the well-maintained 3-storey construction that had passed the compulsory building condition survey initiated to assess the stability of structures ahead of the tunnelling.

Unable to sleep the night at the hotel where they have been put up because of the emergency relocation, in the morning he had got to check the extent of the damage. "It took 40 min to get my immobile mother down the narrow staircase," he replied.

Questioned why this building, that fell on the Tunnel Boring Machines influence zone of 25 meters, wasn't evacuated before the tunnelling, an official stated, "All the parameters suggested that it was a healthy structure." An electrical goods trader at Tiretta Bazar Kesari said, "Yes, we have managed the property, that my grandfather had purchased 125 years ago. It seems to be falling apart suddenly."

He along with his family were evacuated when Chundee, the TBM which was digging the westbound tunnel hit the aquifer below the nearby Durga Pithuri Lane on August 31, 2020.

The machine is now lying defunct 14 meters under the ground. Its twin, Urvi, continued tunnelling on Feb. 18th, 2020, on Calcutta high court's orders. "In August, there are some cracks had appeared on the walls of our building. But that was nothing compared to these," Kesari stated. Kolkata Metro and ITD-Cementation contracted to develop the last leg of Kolkata East-West Metro are taking some measures to encourage the Kesari residence.

The complete building has been propped up with iron beams. Grout mixtures are being injected. "The residents shouldn't panic. If they are feeling insecure we are set to shift them to hotels," a KMRC spokesperson stated. Debashish Pradhan 33, a resident of 4C Gour De Lane stated, "And what happens after we return from the hotel? The tunnelling work should be stopped immediately."

Kolkata: Midnight Evacuation as Building cracks widen on East-West Route; India

TNN | Mar 13, 2020, 04.38 AM IST



KOLKATA: Thirty-six Bowbazar residents were evacuated after midnight on Thursday 12.03.20 as cracks that had surfaced the previous day on their house at 5/2 Gour De Lane started widening.

Gour De Lane is within the zone, where buildings fell after one of the tunnel boring machines (TBMs) digging the East-West Metro tunnel hit an aquifer last year, leading to large-scale subsidence. Kolkata Metro Rail Corporation (KMRC), implementing agency of the project, however, ruled out a repeat of the August 31 disaster, considering the host of precautionary measures they have taken for the second phase of tunnelling.

NO NEED TO PANIC: KMRC




Pics: Ajanta Chakraborty



Tiloki Kesari (L) points to cracks in his house; (above) readings of a crack on 5/2 Gour De Lane and (below left) Kesari with his family at a central Kolkata hotel

“ We have maintained the house so well. And now it seems to be caving in
Tiloki Kesari, 64

“ When can we go home? The hotel is no place for an old woman with mobility issues
Jhiliya Devi, 87

Slum-dwellers shifted

Late on Wednesday, KMRC started evacuating those living in the slums of Gour De Lane, as residents complained that cracks have appeared on their structures. They have been shifted to a central Kolkata hotel. **TNN**

Residents panicked nonetheless as buildings along the narrow bylane off Bowbazar developed cracks in the last 36 hours. Crack meter readings on the terrace of 5/2 Gour De Lane revealed that fissures had increased almost four times — from 4.5mm on Wednesday to 16 mm on Thursday.

Tiloki Kesari, one of the owners, took TOI on a round of the well-maintained three-storey structure that had passed the mandatory building condition survey (BCS) undertaken to

assess stability of structures ahead of the tunnelling. Unable to sleep the night at the hotel where they have been put up due to the emergency evacuation, he had come to check the extent of damage in the morning. "It took 40 minutes to get my immobile mother down the narrow staircase," he said.

Asked why this building, that fell on the TBM's influence zone of 25 m, wasn't evacuated before the tunnelling, an official said, "All the parameters suggested that it was a healthy structure." Kesari, an electrical goods trader at Tiretta Bazar, said, "Yes, we have maintained the property, that my grandfather had bought 125 years ago. Suddenly, it seems to be falling apart."

He and his family were evacuated when Chundee, the TBM, that was digging the west-bound tunnel, hit the aquifer below the nearby Durga Pithuri Lane on August 31, 2019. The machine is now lying defunct 14 m below the ground. Its twin, Urvi, resumed tunnelling on February 18th, 2020, on Calcutta high court's orders.

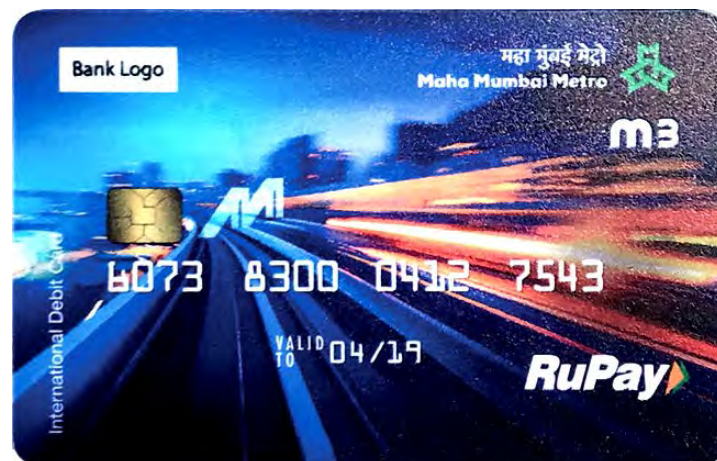
"In August, some cracks had appeared on the walls of our building. But that was nothing compared to these," Kesari said. KMRC and ITD ITD-Cementation, contracted to build the last leg of East-West Metro, are taking a several measures to strengthen the Kesari residence. The entire building has been propped up with iron beams. Grout mixtures (cement, sand and water) are being injected. "The residents shouldn't panic. If they are feeling insecure, we are ready to shift them to hotels," a KMRC spokesperson said.

Debashish Pradhan, 33, a resident of 4C Gour De Lane, said, "And what happens after we return from the hotel? The tunnelling work should be stopped immediately."

MMRDA, Mumbai, plans mobile App Card to access all Lines; India

The Features of the Application are as follows: To book tickets, check Train Timings & Schedules, to purchase Season Passes and figure out interchangeable Metro Stations. The app would map the Metro Stations and the Metro Network.

By [Neha Singh](#); 03/03/20; Metro Rail News



MUMBAI (Metro Rail News): The MMRDA is working on a mobile app which allows users to book Metro tickets. The authority launched Metro travel card dummy on Friday which will provide users to access all lines in the Metro network. The card would be available to commuters by December when 2 more Metro lines – [Metro 7 and Metro 2A](#)– would be operational.

MMRDA is working on the construction of 14 lines with a total distance covering over 350 km. Currently, in Mumbai only Versova-Ghatkopar line is operational. The features of the application are as follows – to book tickets, check train timings & schedule, purchase season passes and figure out interchangeable metro stations. The app would map the Metro stations and the Metro network. "It is in a nascent stage and details are being discussed," stated an MMRDA official.

MMRDA showcased the dummy common metro card for all metro rail lines under the integrated ticketing system, which would be available in 2 designs. The new card will have a chip containing all the essential information embedded in it and looks similar to a debit/credit card. "We have shortlisted the designs of these two cards after scrutinizing over twenty different designs. This 'single card' for all metro lines will be available for people by December when the two Metro lines of metro-7 and metro-2A will be ready," stated RA Rajeev, MMRDA commissioner.

Officials told Mirror that the card could also be integrated to gain access to other modes of transport as well as the suburban local trains, BEST buses, taxis and Autos. Subsequently, it may even be connected to bank accounts and people can use it to shop also. However, this card has been a bone of contention among the Indian Railways and MMRDA due to technical differences over the last 3 years.

The MMRDA has finalised the designs that how the Metro stations on these 2 lines would look. The Metro-7 on Dahisar (E)-Andheri (E) line would be called 'Redline' where the Metro-2A in Dahisar (W)-DN Nagar would be called 'Yellow line'. The background of all the signages would be in black. The other indicators including station names would be in red or yellow, as per the metro line.

Chennai Metro inter-modal Connectivity at Egmore; India

By [Neha Singh](#); 03/03/2020; Metro Rail News

As per the Officials of CMRL, now if People exit the Station then they have to cross the Parking Lot, climb the Foot Over-Bridge and then get to the Suburban Platform of Egmore Railway Station.



Chennai Metro Depot

CHENNAI (Metro Rail News): Chennai Metro plans to remove the fencing between Egmore Metro station and the suburban platform so that passengers can quickly walk across while changing their mode of transport. As per the officials of CMRL, now if people exit the station, then they have to cross the parking lot climb the foot over-bridge and then get to the suburban platform of [Egmore Railway Station](#).

"If we remove the iron fencing, they can reach the suburban platform immediately. We didn't earlier foresee that passengers would have to take a circuitous route to reach that platform. The idea of providing inter-modal connectivity is that passengers should never feel the strain of switching from 1 mode of transport to another. In the coming weeks, we will remove the fencing and put up signage as well," said an official.

Presently [CMRL](#) has also inter-linked the concourse level of Egmore Metro station to the foot over-bridge that would take passengers to the suburban platform of Egmore Railway station. The pathway from the concourse level, that would lead passengers to the lift and it would take them to the foot over-bridge said, officials. They have installed signage at many places to supervise passengers as well.

Egmore Metro station is an important station as thousands of passengers go to the railway station to catch outbound trains from Chennai. Sources told that there should also be signage at the Egmore Railway station at some important areas, telling commuters the way to the Egmore Metro station and they should also put up Metro Rail timings.

National Capital Region Transport Corporation (NCRTC) to integrate Delhi-Meerut RRTS Corridor with other Modes of Transport; India

NCRTC plans to offer all the Commuters Hassle-free Interchange to different Modes of Transport to reach their Destinations across the NCR by the multimodal Transportation Hubs, that includes Delhi and Districts near it from the States of Haryana, UP and Rajasthan.



Artist`s Vision for Delhi-Meerut RRTS Semi-High Speed Train

NEW DELHI (Metro Rail News): National Capital Region Transport Corporation (NCRTC) has made a plan to proposed to implement under the [Regional Rapid Transit System](#) project and integrate its high-speed trains, with the other transportation centres like bus stands, railway stations along with Metro stations at 3 significant points that are Anand Vihar in Delhi, Sahibabad and near Shaheed Sthal Metro station in Ghaziabad.

NCRTC plans to offer all the commuters hassle-free interchange to different modes of transport to reach their destinations across the NCR by the multimodal transportation hubs, that includes Delhi and districts near it from the states of Haryana, UP and Rajasthan.

At this Time the NCRTC is building a priority stretch of 17 km from Sahibabad-Duhai in Ghaziabad and out of the ₹ 30,274 Cr, 82 km RRTS route within Delhi, Ghaziabad and Meerut. The total stretch has about 11.53 km underground section out of which 5.8 km is among New Ashok-Nagar and in Sahibabad. "At Anand Vihar, we have planned an underground integration centre with the railway station at Anand Vihar. Here, the RRTS would also give access to ISBT Anand Vihar and Kaushambi and 2 nearby Metro lines. Connectivity would be given either by escalators or foot overbridges," declared an NCRTC official.

The official also added that they plan to link the RRTS system with ISBT Kaushambi-dissuade commuters from using the Ring Road through reducing the load on the key surface link. "We have 2 other interchange points at Sahibabad and New Bus Adda in Ghaziabad apart from Anand Vihar. We have shared our plans with DMRC as our consultant. The **multimodal transportation hubs** will reduce dependency on private vehicles and will shift commuters to use public transport. This would also help in reducing pollution," said the chief spokesperson Sudhir Sharma of NCRTC.

NCRTC has planned to establish the RRTS station on 2 levels — concourse and platform-level at Sahibabad, The ticketing and other passengers-centric facilities would be ready at the concourse level.

"The Sahibabad station will offer integration with Uttar Pradesh State Road Transport Corporation bus depot and Sahibabad Metro station offered under the plan of Vaishali Metro extension. The RRTS station will have 3 entry and exit points. One of the entry and exit points would be at the bus depot where other entry & exit point will provide access to passengers coming from Sahibabad Site IV Industrial Area and Sahibabad railway station. The 3rd points would provide integration with the proposed Metro extension from Vaishali to Mohan Nagar," the officer stated. The 3rd entry & exit point will also have a pedestrian-friendly skywalk/foot overbridge to grant access to locals from Vasundhara.

The RRTS plans to build another **integration hub** near Shaheed Sthal Metro station, further towards Meerut. The NCRTC has also planned a major commercial centre at Hindon Motel, adjacent to Shaheed Sthal Metro station, that will house a multi-storeyed commercial complex and the RRTS station. As per the NCRTC, the station would have 4 entry & exit points. There are 3 independent entry & exits of which 2 are planned towards the Delhi-Meerut Road where 1 is towards the GT Road. Another entry & exit would give direct integration with the New Bus Adda Metro station via foot overbridge. "The distance between the 2 stations is approximately 200 m," the official stated.

Regularly, the detailed RRTS project report says that about eight lakh commuters were supposed to board the RRTS trains for long and short-distance commuting. Earlier, in the last week of Feb, NCRTC officials had met UP Government officials and asked their intervention in linking the electric-bus routes near to the RRTS stations in Ghaziabad Meerut districts.

Uttar Pradesh Metro Rail Corporation (UPMRC): New Technology to expedite Metro Work; India

By [Neha Singh](#); 24/02/2020; Metro Rail News

On Saturday a UP MRC Official said that since the Starting its Civil Engineers, on the Basis of their Experience from the Lucknow Metro Project, we're trying to innovate Civil Construction Work Techniques while executing the Kanpur Metro Project.



Lucknow Metro at Station

KANPUR (Metro Rail News): Uttar Pradesh Metro Rail Corporation (UPMRC) has initiated a new technique to speed up the ongoing construction work of [Kanpur Metro](#) project and assures the safety of the workers at the site and the common people.

On Saturday 01/03/20 a UPMRC official said that since the **starting, its civil engineers, based on their experience from the Lucknow Metro Project**, we're trying to innovate civil construction work techniques while executing the Kanpur Metro Project. Earlier he said that concourse slab of the elevated station, a portion just above the road was constructed on sacrificial shutters were laid over the erected precast beams.

The station concourse slab will now be constructed the new innovative technology. The slab with beam will be built in advance at the casting yard and placed at the assigned place. By the help of this technique, the work will gain momentum, and simultaneously safety-related apprehensions will be reduced. Along with this, the outer beauty of the stations will also be improved", an official added.

As per the source in MRC, the civil work of the KMP is progressing at full-speed from the starting. According to a result of the state-of-the-art technology, UPMRC is completely confident that the construction of the Priority Corridor between IIT-Kanpur and Motijheel would be finished within the stipulated time frame.

During three months since the construction work commenced on Kanpur Metro at the IIT-Kanpur gate, above 500 piles and 35 pillars have been prepared under the project. Concurrently he casting of the U-girder is also continuing in the casting yard.

CMRL, Chennai, plans to build high rise Building above the elevated Metro Depot; India

By Anushka Khare; 05/01/20; Urban Transport News

Tender for Construction of a 20-storey Building as well as the Development of four-Level Parking Spaces will be floated soon.



Chennai Metro Depot

Chennai, India (Urban Transport News): With the aims to integrate real estate and public transport and generate non-ticketing revenue, Chennai Metro Rail Limited (CMRL) is planning to build a 20-storey building above the elevated depot cum station at Wimco Nagar which is near Thiruvottiur and 600 m away from the beach.

Apart from the building, CMRL is also planning to develop a four-level parking space below the stabling lines. The Wimco Nagar depot is likely to be ready by end of this year i.e. December 2020. This depot is part of the phase-1 extension line from Washermenpet to Wimco Nagar with nine metro stations. Tender for construction of a 20-storey building as well as the development of four-level parking spaces will be floated soon.

Hyderabad Metro, HMRL, beats Hong Kong Metro in Terms of lowest Manpower; India

Hyderabad Metro, which is the 2nd largest Metro in the Country after Delhi Metro, has now created its mark globally by attaining lowest Manpower in Terms of its Services.

By [Neha Singh](#); 03/03/2020; Metro Rail News



HYDERABAD (Metro Rail News): Hyderabad Metro, which is the 2nd largest metro project in the country after Delhi Metro, has now created its mark globally by attaining lowest manpower in terms of its services.

As per the Hyderabad Metro Rail Ltd managing director NVS Reddy, Hyderabad metro has beaten Hong Kong metro in lowest manpower. "While the Hong Kong metro has 25 personnel per km for its operations HMRL has eighteen personnel for each kilometre," stated Reddy adding that the achievement shows the efficiency of Hyderabad Metro.

The Hyderabad Metro Rail LTD is termed as the largest metro rail network carried out in Public-Private Partnership model. "More of the services will be implemented soon for the convenience of the passengers," declared N.V.S. Reddy.

The HMRL has now moved its focus on the phase-2 after the launch of services between Jubilee Bus Station (JBS) and Mahatma Gandhi Bus Station (MGBS). Phase-2 of the metro is may have 3 corridors out of that 2 lead to the Rajiv Gandhi International Airport (RGIA).

Hyderabad Metro allows Tickets through Paytm now; India

On a System Launch, the HMRL has taken a Step ahead towards creating urban Mobility Solutions, which are Future-ready. "We believe that by offering these

Tech-powered Solutions, we would serve the Transit Needs of Commuters more efficiently and seamlessly,” said Reddy.

By [Neha Singh](#); 06/03/2020; Metro Rail News



HYDERABAD (Metro Rail News): On Thursday, HMRL Managing Director NVS Reddy launched Paytm QR-code built metro-ticketing system at here for a trouble-free ride to the commuters. The [Hyderabad Metro Rail](#) has also chalked out plans to launch QR-code built ticketing passes in several days.

On a system launch, the HMRL has taken a step ahead towards creating urban mobility solutions which are future-ready. “We believe that by offering these tech-powered solutions, we would serve the transit needs of commuters more efficiently and seamlessly,” said Reddy.

This service would give passengers a new right to travel seamlessly and avoid large queues to get tokens at metro stations. They can now purchase a QR-code ticket on their existing Paytm app, which can be displayed at the automatic fare selection gates to proceed for the journey. The progress is pointed at reducing cash transactions and to encourage digital transactions. The HMRL will soon induct 2 more trains between Ameerpet-Raidurgam route, he stated.

L&T Metro Rail Hyderabad Limited MD K. V. B. Reddy told the launch of mobile QR ticketing in partnership with Paytm will help people to book digital ticket very easily. This feature will help over 14 lakh smart cardholders using metro service to book single, return, store value and trip pass ticket using Paytm app. The tickets can be pre-booked and come with a validity of 1 day.

The company moreover planned to stretch this service to metro-feeder buses to assure last-minute connectivity in the city, he replied.

Paytm Senior VP Abhay Sharma stated, QR-code ticket booking feature will help in reducing overcrowding at the ticket counters.

Lucknow Metro introduces Braille Ticketing; India

9th March 2020; Metro Report International



INDIA: Lucknow Metro has introduced Braille versions of its GoSmart cards as part of the first-year anniversary of its 23 km North-South corridor on March 8th, 2020.

According to operator Uttar Pradesh Metro Rail Corporation, Lucknow Metro is the first public transport system in India to use Braille ticketing.

The cards were introduced by UPMRC Managing Director Kumar Keshav, who also unveiled a celebratory wall of celebrity signatures at Hazratganj Metro station.

PART II: GLOBAL ACTIVITIES FOR URBAN MOBILITY AS A SERVICE

Bentley Systems announces the Acquisition of GroupBC, UK Leader in Cloud Services for Construction Information Management; Global

By Metro Rail News; 12/03/2020

Advancing Project and Asset Common Data Environments (CDEs) through Digital Twins.

Bentley Systems, Incorporated, a leading global provider of comprehensive software and digital twins services for advancing the design, construction, and operations of infrastructure, today announced the acquisition of GroupBC, a leading UK SaaS software innovator. For over twenty years, GroupBC's and Bentley's software solutions have been deployed for complementary purposes to improve project and asset information management.

The transaction results from GroupBC's expansion agenda, and Bentley's investment appetite, for international growth opportunities stemming from the UK's national initiatives for major infrastructure investment and towards infrastructure digital twins. GroupBC's CDE solutions, BC Projects and BC Enterprise+ have been widely applied in the UK for information management respectively across construction and asset estates. Largely due to the UK's substantiated ROI experience and its global thought leadership, CDEs have become increasingly availed globally in "going digital" for capital projects and resulting assets.

In 2019, the UK's (BS 1192) construction project information management guidelines were largely adopted within the global standard ISO 19650. Also in 2019, in its inaugural study of the overall market for Collaborative BIM, ARC Advisory Group ranked Bentley's ProjectWise system as #1 worldwide.

The new opportunity is to build on ISO 19650, and GroupBC's UK information management experience, to advance collaborative BIM, through "evergreen" digital twins, to span infrastructure lifecycles. In combination, Bentley's iTwin Services will now be leveraged to uniquely connect GroupBC CDEs and ProjectWise CDEs. Through semantic alignment and change synchronization, the resulting digital twin's cloud services will securely federate – fully enabling 4D mixed reality and analytics visibility – previously separate CDEs for construction and engineering.

Keith Bentley, Chief Technology Officer for Bentley Systems, said, "Our iTwin cloud services, taking advantage of iModel-based solutions for interoperability, are ideal for federating CDEs. This enables us to assure that the users of our BC SaaS services will benefit from further extending the value of their project and asset information through digital twins.

With the help of our new GroupBC colleagues, we will now be able to better serve engineers, contractors, and owners by bringing together their collective IT (information management), OT (operational technologies including reality modelling), and ET (engineering models). I am confident that the resulting improvements in project and asset performance will be consistent with the UK's demanding but welcome expectations for new ROI breakthroughs from digital twins." Simon Horsley, UK regional executive for Bentley Systems, said, "Our many UK users, projects, and owners in common with GroupBC will gain a lot from our joining forces to advance CDEs through digital twins.

I have been tasked by Bentley management to help The UK to continue to lead the world in going digital for infrastructure advancement, and our new offerings and colleagues from GroupBC bring essential momentum as we pool resources to meet our market's expanded

'infrastructure revolution' requirements. I particularly welcome to Bentley Systems GroupBC's co-founders Sanjeev Shah and Stephen Crompton, and CEO Wes Simmons."

Sanjeev Shah, the co-founder of GroupBC, said, "This is a hugely exciting day for our shared accounts and for both our workforces moving forward. The opportunities which arise from bringing our two companies and their respective product portfolios together are enormous, as is the global reach which Bentley can now add for us. Working together we will be even better able to support, through 'going digital,' construction and asset lifecycles."

Stephen Crompton, CPO and co-founder of GroupBC, added, "Bentley is going to provide a great new home for our products to thrive in. GroupBC has always promoted an integrated, best-of-breed approach, and being able to complement our leading software solutions with existing best-of-breed products from Bentley presents a uniquely exciting opportunity for us and our user organizations, opening the door for unparalleled integration between our solutions and bridging the gaps between design, construction and ongoing asset information management."

Wes Simmons, CEO of GroupBC, said, "Our founders and I would like to thank our equity partner YFM for their visionary support over the last five years. For our GroupBC team, customers, and partners, joining Bentley Systems ensures a future of continued growth, including beyond construction information management through broadly federated digital twins and international expansion. Here's to BC CDE and digital twins advancement!"

About GroupBC

GroupBC has been developing enterprise-scale information management solutions for construction-related projects and asset owners since 1998. GroupBC's extensible, UK hosted Common Data Environment (CDE) makes it easy for teams to collaborate, manage and share documents data and spatial information from a central, secure cloud-based platform. GroupBC is renowned for pushing the boundaries of technology, integrating project and asset data with external systems and datasets in order to provide rich and valuable insights which enable timelier and better decision making. Customers include Balfour Beatty, Costain, Nationwide Building Society, Sainsbury's and Thames Water.

About Bentley Systems

Bentley Systems is a leading global provider of software solutions to engineers, architects, geospatial professionals, constructors, and owner-operators for the design, construction, and operations of infrastructure. Bentley's MicroStation-based engineering and BIM applications, and its digital twin cloud services, advance the project delivery (ProjectWise) and the asset performance (AssetWise) of transportation and other public works, utilities, industrial and resources plants, and commercial and institutional facilities. Bentley Systems employs more than 3,500 colleagues and generates annual revenues of more than \$700 million in 172 countries. From inception in 1984, the company has remained majority-owned by its five founding Bentley brothers.

First Hydrogen Train arrives in the Netherlands; Netherlands

27th Feb. 2020; Railway News

On 26th February 2020 the first hydrogen train arrived in the Netherlands. The Dutch rail infrastructure manager ProRail led the train into the country from Germany via Oldenzaal and then ran it on track to its provisional parking facility in Leeuwarden.

Over a two-week period the hydrogen train will undergo several test drives between Groningen and Leeuwarden. The public will also have the chance to view the hydrogen train on 7 March, when it will be at Groningen Station between noon and 4 pm.

Arrival in Leeuwarden

On Wednesday locomotives hauled the train on to Dutch track. The only route where it will be allowed to run independently is the test route between Leeuwarden and Groningen.



Alstom's Coradia iLint begins Testing in the Netherlands; © Alstom

Night-Time Test Drives

The night-time test drives will take place between 27th February and 14th March 2020. There will only be test crew on board at the time. [DEKRA](#), a vehicle inspection agency based in Stuttgart, will be involved in these tests as the independent test organisation.

The test drives will give ProRail practical experience of the environmentally friendly hydrogen technology. This will be the first time a hydrogen train will operate in the Netherlands. ProRail wants to learn how the train can run the timetable, what its fuel consumption will be, and how the re-fuelling works.

Hydrogen Technology

Hydrogen technology is finding increasing applications, with its use on trains being just one. ProRail wants to learn whether hydrogen trains are a viable component of a carbon-

neutral track by 2050. Besides being more environmentally friendly than their diesel counterparts, hydrogen trains are also quieter.

Arriva, the train operating company, backs up this ambition. The province of Groningen's buses run on hydrogen and a number of garbage trucks in the municipality as well as sweepers also run on hydrogen. Therefore a hydrogen train is a logical next step.

Coradia iLint

The manufacturer of the hydrogen train is Alstom. Type Coradia iLint, it is already in regular passenger service in Germany along the Cuxhaven, Bremerhaven, Bremervörde, Buxtehude line. The Netherlands is now the second country to run a hydrogen train on its tracks.

The parties involved in these tests are the province of Groningen as the client, which will carry out the test drives with ProRail. Arriva meanwhile is the operator. Engie supplied the hydrogen and was responsible for the tank installation. Alstom is the manufacturer of the hydrogen train and DEKRA is the independent test organisation.

Calgary orders 15 Siemens S200 light Rail Vehicles; Canada

26th February 2020; Metro Report International



CANADA: Siemens Mobility announced a further contract to provide 15 S200 light rail vehicles to Calgary Transit on February 25.

They will be built at Siemen's Sacramento facility to replace CTrain's U2 LRVs which have operated since the 1980s.

The order is in addition to the 63 S200 ordered in 2013 for C\$200m, which have already been delivered.

According to Calgary Transit, the design of the LRV front is inspired by an ice hockey goalkeeper mask. It was chosen by city residents ahead of designs inspired by the Bow River and a buffalo.

Nairobi Meter Gauge Light Rail Vehicle DMU Deal for Commuter Service signed; Kenya

3th March 2020; Railway Gazette International



Mallorca, Spain, CAF build Meter Gauge LRT Diesel LRV

KENYA: The much-delayed contract for Kenya Railways to purchase 11 second-hand DMUs from Serveis Ferroviaris de Mallorca to operate commuter services around Nairobi was formally signed by KR Managing Director Phillip Mainga during a visit to the Balearic island on March 2.

SFM's metre-gauge Class 61 DMUs built by CAF in 1995-2003 were put up for sale as surplus to requirements following the completion of 1.5 kV DC electrification from Enllaç to Sa Pobla in January 2019. Several have already been sold to companies in France and Portugal.

Following a technical assessment of their condition and 'operational suitability', Kenya's Ministry of Transport agreed to buy 11 two-car units and five spare vehicles under a KSh1.15 bn deal including spare parts. KR pointed out that this would be around 10% of

the cost of new stock, adding that the CAF units could be expected to operate for a further 20 to 25 years. At that stage it was envisaged that the DMUs would be delivered by mid-2019.

The acquisition forms part of a master plan to expand commuter services on five routes radiating from the Kenyan capital, in a bid to reduce traffic congestion. The objective is to increase capacity from 13 000 to 132 000 passengers a day by 2022. As well as procuring the DMUs, KR will refurbish 20 loco-hauled coaches to augment the 40, which KR is currently deploying on suburban services, and will build nine new stations.

Of the five routes, one links Nairobi Central to the Standard Gauge Railway hub at Syokimau in the capital's southeastern suburbs, while another continues southeast along the former Nairobi – Mombasa main line to Athi River, where a new station is to be built at Kitengela. Passenger services will also be revitalised on the branch running northeast to Thika, serving new stations at Umoja and Kenyatta University, while inner-suburban services will run as far as Embakasi, close to the international airport. The fifth route runs northwest along the historic main line as far as Kikuyu on the Rift Valley escarpment; on this line KR expects to develop new or rebuilt stations at Strathmore University, Mbagathi Way, Kibera, Dagoretti and Thogoto.

Last month, KR announced the start of work to revitalise the infrastructure on the 177 km Nairobi – Thika – Nanyuki line. It said this would provide 'faster, reliable and safe transport' for freight and encourage economic development whilst reducing wear and tear on local roads. A key objective is to serve the Vivo Energy high capacity storage depot in Nanyuki, while Special Economic Zones are to be established in each of the six counties served by the line.

Austin's Capital Metro gearing up for massive Light Rail System; USA

March 06., 2020 , written by Bill Wilson, Editor-in-Chief; IRJ Pro



Austin's Capital Metro is proposing a Mammoth Light Rail Line; Animation

Some think big, but Austin's Capital Metro is thinking massive.

The Texas transit agency is rolling out plans for a light rail system that will include a subway system through downtown Austin, city tunnels, a new bridge across Lady Bird Lake and a connection to the Austin-Bergstrom International Airport. The total cost of the project could be as high as \$10 billion. Capital Metro is expecting to make the recommendation at a joint meeting between the Austin City Council and the Cap Metro board.

When Capital Metro initially announced the plan a few months ago, the cost was expected to be about \$4.7 billion. Paying for the endeavor might require a massive tax increase, bond or both. The Austin City Council is expected to put something on the November ballot related to the new Orange Line project. The Federal Transit Administration could cover 40 percent of the cost.

"These recommendations are a bold vision for moving people today and planning for the future of our growing region," Capital Metro President Randy Clarke said in a statement. "Our community made it clear that they are ready for action, and this plan is the beginning of a mobility transformation that will improve the quality of life for everyone."

The Orange Line will run near U.S. 183 and close to the University of Texas before moving to south Austin. Future plans call for the line to extend north to Tech Ridge and as far south as Slaughter Lane. An improved Blue Line would connect the Austin-Bergstrom International Airport to Riverside Drive and ultimately to Trinity Street. It would include the new rail bridge over Lady Bird Lake.

The public will be able to comment on the plans over the next two months.

250 kmph "High-Speed" Regional Rapid Transit Metro proposed in Guangzhou Region; China

Railway Gazette International, March 2020, p.13



Guangzhou's Municipal Government has proposed the construction of three 250 kmph 'high speed metro' lines as part of its recently approved 15-year plan to increase public transport's market share to 80%.

Aim is to reduce journey times between the major cities in the Guangdong – Hong Kong – Macau Greater Bay Area to 60 minutes or less, through the development of a comprehensive urban rail network based on three levels of metro — normal, express and high-speed.

515 km Guangzhou metro network is currently the world's third longest. Work is underway on two 160 kmph 'express metro' lines, with more planned. Line 18 will run 65.3 km from Guangzhou Dong Railway Station to Wanqingsha, serving nine stations, and the 31 km Line 22 from Bai'etan to Wanqingsha will have 10 stations. Planned Line 28 would run for 110.3 km from Foshan Xi Railway Station to Xintang with 18 stations.

Of the three planned 250 kmph 'high-speed metro' lines, one would run for 81.7 km from Sino-Singapore Guangzhou Knowledge City station to Nansha, serving seven stations. Others are provisionally branded as the Airport and Guangzhou – Conghua lines.

Feasibility of “Medium-Speed” Maglev Technology developed by Max Bögl for public urban Transport examined in Germany; Germany

Eisenbahn Technische Rundschau March 2020, p. 7,eurailpress



Vision of “Medium-Speed” Maglev for Public Urban Transport on Test Rig in South Germany, System Max Bögl

The German Federal Ministry of Transport wants a feasibility study to investigate the use of maglev trains in local transport. One wants to check what technical, economic and ecological potential the technology also has in comparison to other means of transport such as underground light metro rail, regional commuter rail or light rail transit, said Federal Transport Minister Andreas Scheuer (CSU).

It is a "completely new magnetic levitation system" developed by the construction group Max Bögl. The trains of the Transport System Bögl (TSB) travel up to 150 kmph, in the tunnel as well as on elevated structure or at ground level. There has been a test track in Sengenthal in South Germany since 2017.

The specific implementation of TSB magnetic levitation technology is to be checked at Munich Airport. The airport operators expect an increase in traffic flows on the area of the airport in the coming years. Against this background, the aim is to improve mobility on the site, said CEO Jost Lammers.

The Bögl Company was part of the industrial consortium, that once wanted to build the High Speed Maglev Transrapid in Germany. The project failed. According to the company, the now planned train is designed for distances of up to 50 km. An estimated cost of between 30 million and 50 million Euros is incurred per kilometer of travel.

Barcelona introduces 105 Diesel-Electric Hybrid Buses; Spain

6th March 2020; Metro Report International



SPAIN: MAN Truck & Bus announced it had completed delivery of 105 Lion's City buses to Transports Metropolitans de Barcelona on March 5th, 2020.

Ordered under a € 37.7 m fleet renewal contract signed in 2019, the vehicles will operate on most routes. All were delivered between December 2019 and March of this year, bringing Barcelona's 'modern' bus fleet to 184.

The 79 12 m long rigid buses – 30 of which are diesel/electric hybrids – and the 26 18 m long articulated ones are equipped with cameras and sensors that warn drivers of impending collisions.

The sensors also collect data about the buses' routes, and according to TMB this information will be used to identify safety hotspots as part of its 'Autonomous Ready Spain' programme, which seeks to reduce traffic accidents due to human error.