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Delhi Metro Rail Corporation Limited

› REPORT

UITP INDIA URBAN RAIL SEMINAR 2022

MARCH | 2022



International Association of Public Transport (UITP)
Rue Sainte-Marie, 6 | B-1080 Brussels | Belgium

Tel: +32 2 673 61 00
info@uitp.org
www.uitp.org

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About UITP

INTRODUCTION

Public transport system has played key role in daily mobility needs of citizens, catering to diverse sections of the society by providing affordable, seamless and safe travel across the length and breadth of the country. Metro rail systems constitute a significant portion of public transport systems especially in growing and expanding urban areas in India.

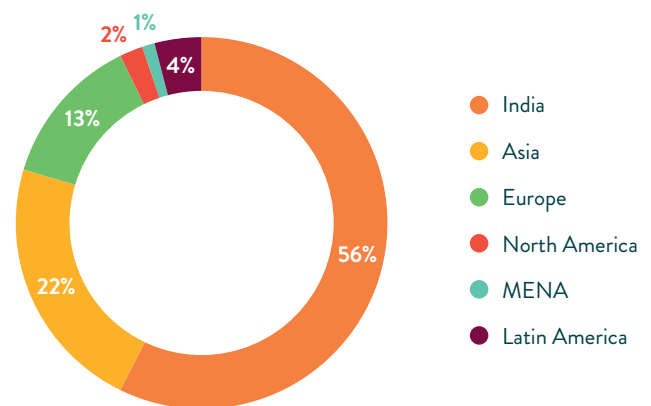
Metro rail systems in India witnessed a fast growth, from network length of 222 kilometers in 3 cities in 2011 to 697 kilometers in 13 cities by 2021. Further, approval of additional metro rail network of 1,032 kilometers and target to have metro rail network in 100 cities by 2047 by Ministry of Housing and Urban Affairs (MoHUA) will expand the reach of metro systems up to 27 cities. In addition, lighter urban rail systems such as Metrolite and Metro Neo are being conceptualised and developed by many small- and medium-sized cities. With such high developments and long-term targets, along with challenges marred by Covid 19 pandemic, it

becomes imperative to discuss and understand new innovative steps that can be taken to fully utilise the set targets.

Keeping this vision in mind, International Association of Public Transport (UITP) India organised its flagship annual event, supported by Delhi Metro Rail Corporation (DMRC) on Urban Rail. The fifth edition of the UITP India Urban Rail Seminar was held on a digital platform from 09-10 March 2022. The technical sessions were sponsored by KfW IPEX Bank and Cubic Transportation Systems. The media partners were Rail Analysis India, Metro Rail Today and the Urban Transport News.

The event witnessed 310 representations from India and abroad including metro operators, financing institutions, ministries, industries involved in Urban Rail landscape, 44% of registrations to the event were from outside India. One of the key highlights was the presence of 8 women speakers on both days of the Seminar.

The seminar encompassed 24 key national and international speakers sharing their knowledge and experiences on various topics in the Urban Rail Sector viz covid-19 recovery of Urban Rail and financial concerns, technological innovations in Urban Rail, funding and financial innovation, digitalisation in operation and maintenance.



► Participant's distributions

KEY OUTCOMES FROM EACH SESSION

The event was set about with an Inaugural Session where eminent speakers from the urban metro rail sector gave an overview of the recent developments, challenges and opportunities at the global as well as national level in the metro sector. The inaugural session was followed by a Plenary Session where the discussion was focused on the COVID 19 recovery and financial concerns for the urban rail sector.

Following is a summary of the key points discussed in the two days of the Urban Rail Seminar:

INAUGURAL SESSION

The event was set about with an Inaugural session led by Mr Mohamed Mezghani, Secretary General, UITP discussing the uncertainties and challenges due to COVID 19 on the public transport systems. Mr Mezghani focused on three key priority areas that require discussion and proactive solutions in the urban rail sector – focus on innovation and technology, improving financial health, and digitalisation in operations and maintenance. Dr. Mangu Singh, Managing Director of Delhi Metro Rail Corporation shed a light on the innovative steps taken by DMRC to reduce the financial burden as well as achieve climate action goals despite the challenges faced by metro organisation in Covid times. He also focused on the developing indigenous technology for metro systems aligning with larger vision of ‘Make in India’ initiative. At last, he highlighted the Central government’s initiative and targets for rail system across the country, and how the seminar can help to address some of the challenges and achieve the targets optimally. Mr Vikas Kumar, Director Operations, Delhi Metro Rail Corporation delivered vote of thanks expressing gratitude to the speakers, participants and sponsors for the Urban Rail Seminar.

PLENARY SESSION – COVID 19 RECOVERY AND FINANCIAL CONCERNS FOR THE URBAN RAIL SECTOR

1. Vinay Kumar Singh, IRSE, Managing Director, National Capital Region Transport Corporation (NCRTC) briefly provided an overview of NCRTC project, and discussed how during pandemic period, NCRTC managed to overcome the challenges through making best use of electronic platforms and technology
2. Sujatha Jayaraj, IRAS – Director Finance, Chennai Metro Rail Limited (CMRL) discussed in detail the challenges faced by CMRL such as labour shortage

and financial issues due to pandemic. She also discussed steps taken by CMRL to recover financial losses.

3. Alvaro Guzman, Head of Management Control, Metro de Madrid gave an overview of 100-year-old Metro De Madrid rail system, the arrangement between transport authority and government and future challenges for the metro rail system.
4. Flavio Chevis, Chief Executive Officer, Addax, Brazil discussed different funding mechanisms of rail operators in Brazil and impact of Covid on the same.

SESSION - I (TECHNOLOGICAL INNOVATIONS IN URBAN RAIL SECTOR)

1. Iori Mori, East Japan Railway Company (JR East) gave an overview of use of technology to improve customer experience in JR East. He discussed the key technological innovations and value additions through digitalisation to improve commuter travel experience.
2. Sajeev Maheshwari, Delhi Metro Rail Corporation explained the steps undertaken by DMRC for cyber security and digitalisation for better management of IT and OT systems
3. Manod Jinnuri, Cubic Transportation Systems explained the steps to be undertaken for seamless and integrated payment systems and journey enabling mechanism which can be adopted.
4. Simone Pfeil, MetroRio elaborated on the digital payment adoption by customers in Metro Rio using the NFC platform, and the changes this move has brought about.

SESSION – II (FUNDING AND FINANCING INNOVATION IN URBAN RAIL SECTOR)

1. Angela Khoo, Deputy Director - Policy and Regulations, Public Transport Council (Singapore) shared the COVID-19 impact on Public transport funding and business model adopted by PTC. She outlined the challenges faced due to drop in fare revenue and steps taken to cushion the financial impact.
2. Rahul Nilosey, Chief Finance Officer, L&T Hyderabad gave an overview of Hyderabad metro project, need for refinancing owing to Covid 19 concerns and discussed the fundraising mechanism through bonds and commercial papers undertaken by L&T Hyderabad.
3. Chirag Daultani from KfW IPEX Bank and Jae Hyung Kwon from MIGA discussed the alternative commer-

cial financing solutions for mobility and transport. Jae Hyung Kwon explained in detail the advantages of Multilateral Investment Guarantee Agency (MIGA) backed financing structure.

4. Julian Ware, Head of Corporate Finance, Transport for London (TfL) spoke on the working of land value capture model in UK. He discussed the Business Rates Supplement (BRS) applied to commercial developments & how that contributes to funding of TfL.

SESSION – III (DIGITALISATION IN OPERATION AND MAINTENANCE OF URBAN RAIL)

1. Kim Hung Lee shared the transformation happening in MTR in past two years due to technological initiatives. The digitalization is one of the ways to not only improve the running of train but also improve overall performance.
2. Pawan Verma, Joint GM-IT, Maha Metro Nagpur spoke on integrated 6D BIM digital technology and its application in rail sector. He explained first about the impact of digitalization in planning and construc-

tion followed by operations.

3. Amandine Moutte, Project Manager, RATP detailed out the transitioning to an automated metro line in an existing network. She also briefly explained the RATP journey of automation from 1952 till now.
4. Michael Ruffer, Chief Technology Officer (CTO), Verkehrsgesellschaft Frankfurt (VGF) explains about the implementation of CBTC at existing LRV and Tram networks.

INAUGURAL SESSION

The event kick-started with an inaugural session led by **Mr Mohamed Mezghani, Secretary General, UITP** discussing the uncertainties and challenges due to COVID 19 on the public transport systems. Mr Mezghani congratulated Delhi Metro Rail Corporation (DMRC) and other urban rail operators for taking initiatives to build back better transport systems such as introduction of national common mobility card (NCMC), i-ATS the indigenously developed CBTC signalling system, indigenous rolling stock etc.

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Inaugural Session

09 March 2022 | 14:00 IST | 9:30 CET

MEET THE SPEAKERS



Introductory Address
MR. MOHAMED MEZGHANI
Secretary General
UITP – International Association of
Public Transport



Welcome Address
DR. MANGU SINGH
Managing Director
Delhi Metro Rail Corporation



Vote of Thanks
MR. VIKAS KUMAR
Director Operations
Delhi Metro Rail Corporation

SESSION SPONSORS



MEDIA PARTNERS



► Mr Mohamed Mezghani giving his welcome address in the inaugural session

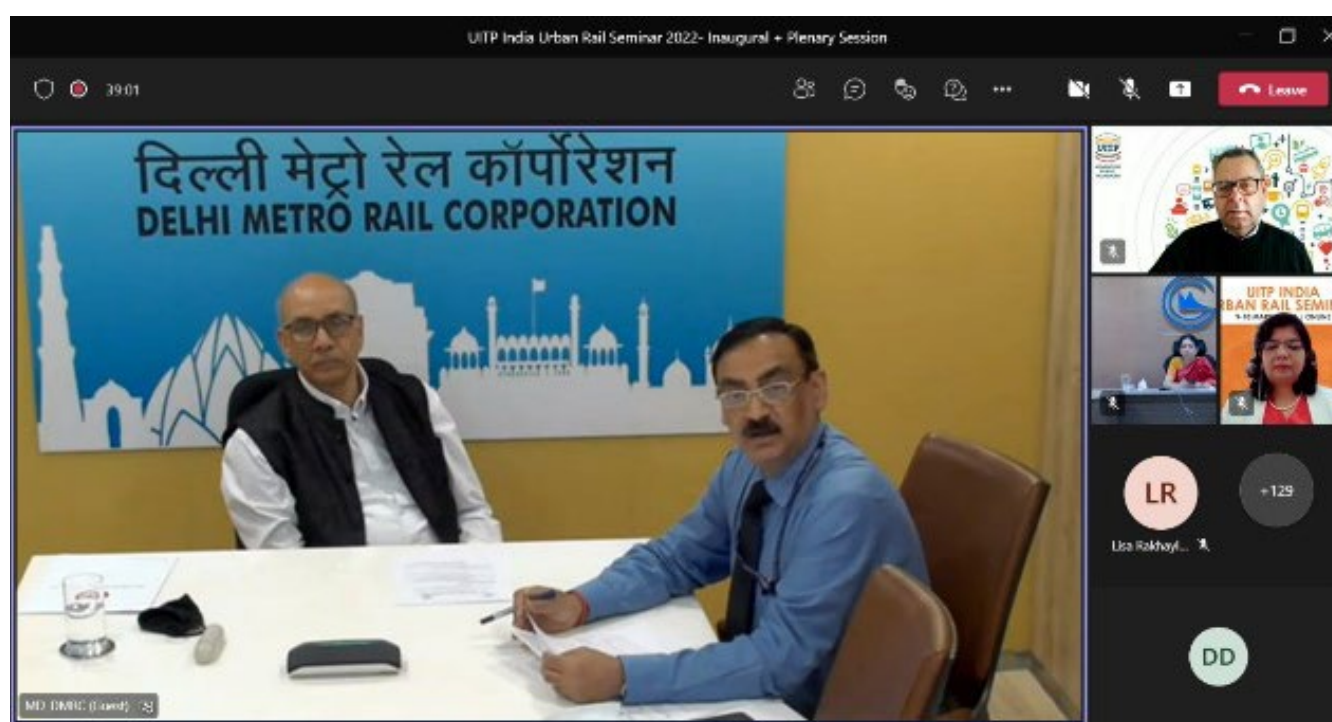
Mr Mezghani further discussed three key priority items related to urban rail sector that requires discussion and solutions. Firstly, due to changing travel behaviours, there is a need to identify innovative methods to attract customers, and focus on innovation in technology to provide better commuter experience. For instance, innovative fare collection systems, cybersecurity can be the key focus areas. Secondly, the decrease in ridership figures post covid has a great impact on financial stability of metro rail systems. Mr Mezghani highlighted how through exploring non farebox revenue sources such as land value capture can be ways to reduce dependency on farebox revenue sources. He applauded

the initiatives taken by metro organisations in India in this regard such as DMRC earning through selling carbon credits, L&T Hyderabad raised finances by selling bonds and commercial papers, and Mahametro focusing on property taxes and real estate to reduce farebox burden. Lastly, Digitalisation in operations and maintenance is another key aspect highlighted by Mezghani that's shaping the way public transport services are delivering.

Dr Mangu Singh, Managing Director, Delhi Metro Rail Corporation (DMRC) reflected on the importance of public transport systems as it caters to diverse sections of the society by providing affordable, seamless and safe travel across the length and breadth of the country. He highlighted the target set by the Ministry of Housing

and Urban Affairs (MoHUA) to have metro rail network in 100 cities by 2047 to mark India's 100th year of Independence and how this would involve large scale investment and a critical planning of metro systems. The recently launched central Budget of India 2022 focuses on two important goals related to energy transition and climate action especially in context of public transport systems. There has been an allocation of around \$2.56 billion for developing metro projects in the country over a couple of years. However, this requires a critical approach and systems planning for efficient utilisation of such a huge amount of money.

Throwing a light on the growth of metro sector and its challenges, Dr Singh made a key point on how in a de-



► Dr Mangu Singh delivering his keynote address in the inaugural session

veloping country like India with diverse income groups, different socio-economic conditions and complex travel patterns, investing in metro rail systems becomes an important political and social issue as it involves a high amount of capital as well as operational costs. The other issue that he mentioned is the integration of existing modes of public transport with metro systems across cities so as to provide more of integration rather than competition between different systems.

Despite the challenges faced by different metro organisations especially after COVID 19, Indian metro systems have been continuously focusing on network expansion, improving passenger experience with ease of travel and information through digitalisation, innovation, and tech-

nological advancements. In this regard, Dr Singh mentioned some of the innovative steps taken to reduce the financial burden as well as achieve climate action goals. For instance, to promote energy efficiency, DMRC earned Rs 195 million over a period of 6 years by selling 3.35 million carbon credits for its regenerative braking project. DMRC also has the largest roof top solar power generation on various metro stations and depots. Dr Singh was pleased to mention that about one third of the energy used by DMRC comes in the form of green energy and how there is a focus on constructing all new buildings on green building norms. Talking about the steps taken to provide better commuting experience and integration with other transport modes, he highlighted

the recently launched 'National Common Mobility Card (NCMC)' by DMRC as part of the 'One Nation One Card' initiative of Government of India.

Dr Singh also noted the focus on developing indigenous technology for metro systems in the country such as the launch of first prototype of an indigenous Rolling Stock Driver Training System (RSDTS) by Delhi Metro Rail Corporation (DMRC) in association with Bharat Electronics Limited (BEL), and technological advancements such as launch of driverless metro on Pink Line in Delhi to bring in more flexibility in train operations, minimise human interventions and errors.

Further, the veteran industry expert focused on how UITP and DMRC have successfully build on the cooperation between the two organisations. Recently, UITP India and I-Metro - a pan India organisation of Metro Rail, Regional Rapid Transit System (RTS) or Mono Rail

systems successfully organised an online roundtable on digitalisation in asset management. The UITP India Urban Rail Seminar 2022 can help address some of the challenges by discussing on key topics such as such as covid-19 impact on Urban Rail sector and financial concerns, technological innovations, funding and financial innovation, and digitalisation in operations and maintenance in Urban Rail sector.

Later, Mr Vikas Kumar, Director Operations, Delhi Metro Rail Corporation (DMRC) closed the inaugural session with a Vote of Thanks on behalf of DMRC to both the speakers. He expressed gratitude to the participants who joined across different metro organisations and companies across India and abroad. Lastly, Mr Kumar thanked the sponsors and media partners who supported Urban Rail Seminar 2022.

PLENARY SESSION I : COVID 19 RECOVERY AND FINANCIAL CONCERNS FOR THE URBAN RAIL SECTOR

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Plenary Session : Covid 19 recovery and financial concerns of Urban Rail Sector

09 March 2022 | 14:40 IST | 10:10 CET

MEET THE PANELISTS



VINAY KR. SINGH, IRSE
Managing Director
National Capital Region
Transport Corporation



SUJATHA JAYARAJ
Director Finance
Chennai Metro Rail Corporation



ALVARO GUZMAN
Head of Management Control
Metro de Madrid



FLAVIO ZATERCA CHEVIS
Chief Executive Officer
Addax



LISA RAKHAYLOVA
Mobility and Transport
KfW IPEX Bank

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The session witnessed a brief discussion on how the global pandemic has impacted the urban rail sector while highlighting various steps taken by transport authorities and future strategies to recover the losses.

Mr Vinay Kumar Singh, IRSE, Managing Director, National Capital Region Transport Corporation (NCRTC) gave a brief introduction on the rail based Regional Rapid Transit System (RTS) comprising of total 8 corridors with each corridor of length 100-150 km. Mr Singh talked about the unique features of RTS such as high-speed system equipped with European Train Control System (ETCS), and specific focus on multimodal integration linking RTS with national railway, interstate bus, airport and local railway network. Reflecting on the impact of pandemic, Mr Sin-

gh mentioned that the movement of goods, machinery and people was restricted due to lockdown. However, making best of the electronic platforms and technology that NCRTC has built for the project such as using BIM or working on building information modelling, they were able to collaborate with people situated in various parts of the world. On being asked, one of the key learnings from international experience he mentioned multimodal integration which currently Indian transport systems lack. Lastly, Mr Singh spoke on the long term financial strategy to support the project, through non fare-box revenue modes such as land value capture, monetising commercial developments along with traditional methods such as advertisements, and station name rights.

Mrs Sujatha Jayaraj, IRAS – Director Finance, Chennai Metro Rail Corporation Limited (CMRL) gave a brief overview of Chennai Metro Transit System. The total route length is 54 kilometers, divided into Phase I of 45 kilometers and Phase I extension of about 9 kilometers and consisting of total 41 stations. Talking about the impact of pandemic, she mentioned delay in project deadlines due to availability of labour, decrease in fare box revenue to 1/4th of the original figures, and the certain charges such as traction charges that had to be paid and could not be cut down. She also discussed the steps taken by CMRL to recover financial issues such as giving concession to the retail shops/small businesses located inside station premises, and allotting more retail spaces to increase non-fare box revenue. Mrs Jayaraj concluded that increase in procurement and construction cost

would be a challenge, but focusing on non-fare box revenue options such as leasing of retail spaces, kiosks, advertisements and land development could help to buffer and financially support the operation of metro systems.

Mr Alvaro Guzman, Head of Management Control, Metro de Madrid talked about 100-year-old Metro De Madrid rail system, with a route length of 100 kilometers, consisting of 302 stations. Most of the expansion was between 1995-2007, as they constructed around 168 kilometers comprising of 128 stations between the same time period. The pandemic did not have much impact on the planned construction targets, however he pointed out the sharp drop in demand and also the revenue lost. But the financial impact was lower as the transport authority had a long-term agreement with government for secured funds based on demand. Discussing the upcoming challenges, Mr. Guzman highlighted that cost of energy due to war would be an issue. Also, due to change in work and travel patterns, it will take many years for Madrid to recover, and hence there is an urgent need to find new ways of funding.

Mr Flavio Chevis, Chief Executive Officer, Addax, Brazil provided brief overview of Sao Paulo's modern metro system with around 100 kilometers long, a majority of which is under construction. The 50% of the metro systems are originally state run while 50% are under PPP contract. He further mentioned that 80% of the original ridership figures were lost due to the pandemic and fare box collections were proportionally hit by the loss of ridership. Mr Chevis also discussed different funding mech-



► Plenary session discussion on Covid 19 recovery and financial concerns of urban rail sector

anism of rail operators in Brazil and the impact of Covid on the same. The state-run operators could manage to survive because of the subsidy support from the government, however the private operators went bankrupt as they were mostly dependent on fare box revenue, with no mechanism of injecting a subsidy from the govern-

ment. As bouncing back of ridership numbers will be an issue in Latin America or Brazil, unlike their Indian counterpart where ridership numbers are already increasing. He reiterated that the real challenge will be the OpEx funding as fare prices are frozen, and because of inflation there will be an impact on the construction cost.

SESSION II - TECHNOLOGICAL INNOVATIONS IN URBAN RAIL SECTOR

The first technical session consisted of interesting presentations on technological innovations by different rail authorities across the world.

The first presentation of the session was made by Mr Iori Mori from East Japan Railways (JRE) on use of technology to improve customer services. JRE, focuses on efficient, on time transportation. They own and operate and maintain their bus and train services. Their focus is on quality, punctuality, rapidity and safety.

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Session II: Technological innovations in urban rail sector

09 March 2022 | 16:05 IST | 11:35 CET

MEET THE SPEAKERS



IORI MORI
International Affairs
East Japan Railway



SAJEEV MAHESHWARI
General Manager IT
Delhi Metro Rail Corporation



MANOD JINNURI
Director Business Development
Cubic Transportation Systems



SIMONE PFEIL
Head of Marketing
Metro Rio



ELEONORA PAZOS
Head of UITP
Latin America

SESSION SPONSORS

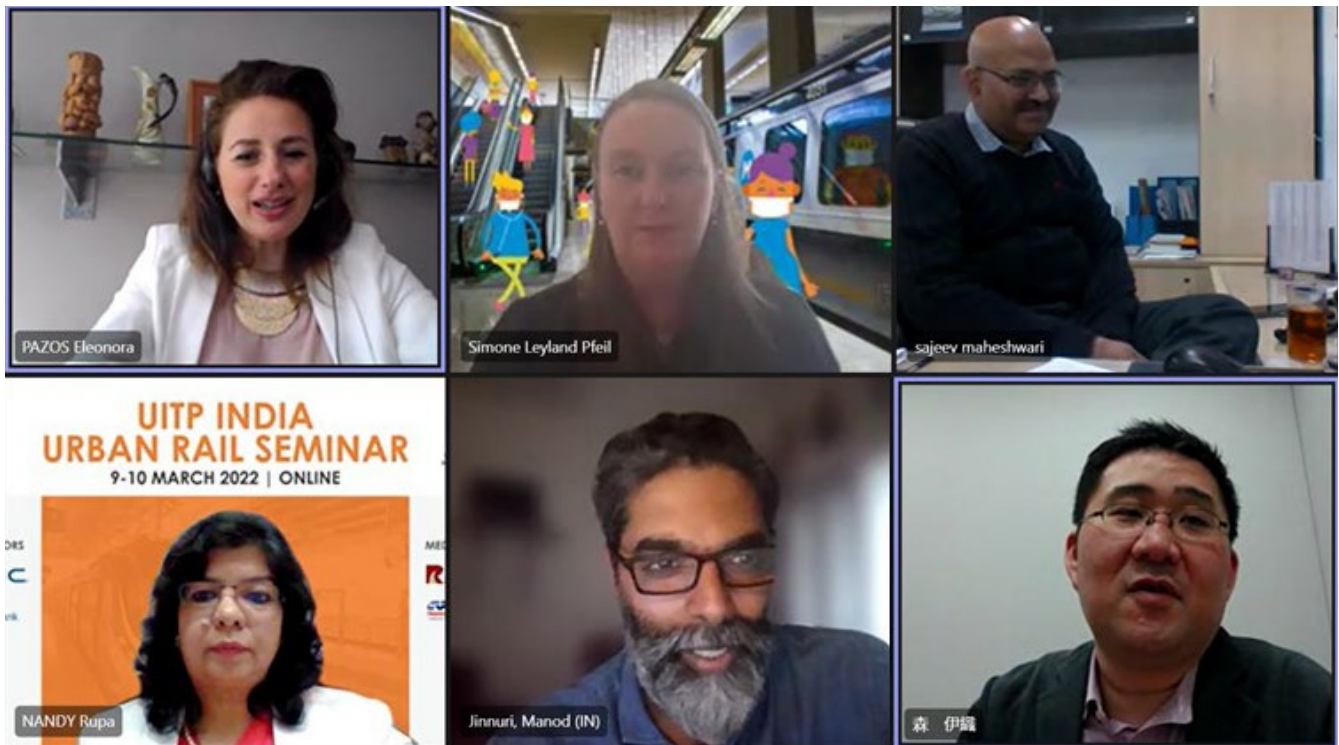


MEDIA PARTNERS

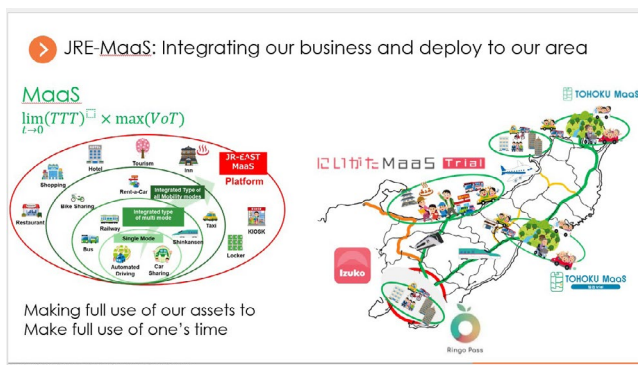


The technological innovation for customers in JRE is focussed around 3 main points.

1. Continuous improvement to services due to fierce competition and number of societal changes
 2. Customer centric mindset is present, and several solutions are provided to align with the JRE business pillar
 3. Multiple touch points and onsite feedback loop is focused on for better service provision
- A passenger has several touchpoints in their daily journey from origin to destination using the transportation modes, and thus JRE focuses on provision of seamless services on all these touchpoints
 - JRE Focuses on Genba or 'on site' areas. With diverse business, they have several Genba areas, for customers to interact at, and for service provisions. This also includes customer support system which collects customer response, suggestions and grievances. Also, there is a frontline development section, where onsite engineers or station staff work towards solution, such as need of new apps or look at issue requiring particular solution, that may fit locally or be expanded for better solution for customers
 - Focus is also on the minimising the travel time and increasing the value of time by integrating the fare for entire journey from origin to destination, despite transfers across modes and services



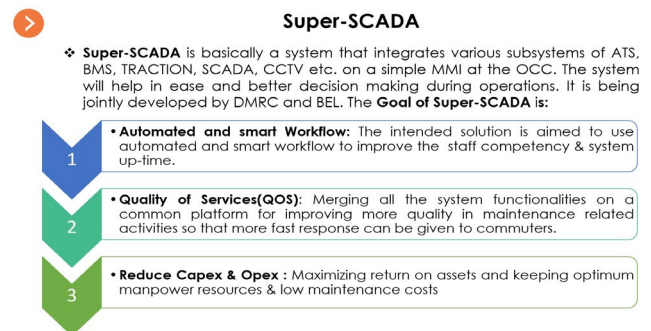
► The first technical session discussion on technological innovations in urban rail sector



- Thus, digitalisation is the best case scenario to focus for the future. For the same, JRE are integrating several startups in their business, in order to build consortiums and to be able to provide better services

Mr Sajeev Maheshwari, General Manager IT for DMRC gave presentation of Cyber security and Digital Innovation. He explained the concept of cyber security and focussed on the role of it in Metro Systems. Cyber security is required to decrease threat to current and future vulnerabilities in IT and OT (Operational Technology) Systems.

- DMRC has DMRC Information Security Policy applicable to all IT and OT systems covering data and data and information security, physical security, identity, access and privilege management, application security, network and infrastructure security and virtualization security



- He elaborated on the challenges faced in the implementation of the cybersecurity measures
- To bring operation optimization from phase one to phase three multiple multiples SCADA systems were involved with propriety architecture, management and maintenance, working in silos. Thus, a super SCADA is envisaged to integrate their diagnostic and maintenance activities to a common platform with AI and data analysis capabilities with goal of automating work. The Super SCADA with single dashboard for multiple system will have all critical failures are reported in real time to station staff
- Another feature available with DMRC is STAMP system for tracking and monitoring projects with features such as integration with Primavera schedules, with BIM 360 design models, role based graphical dashboard for project monitoring, data collection from

field through mobile apps, and hosting of software on clouds for easy access of data

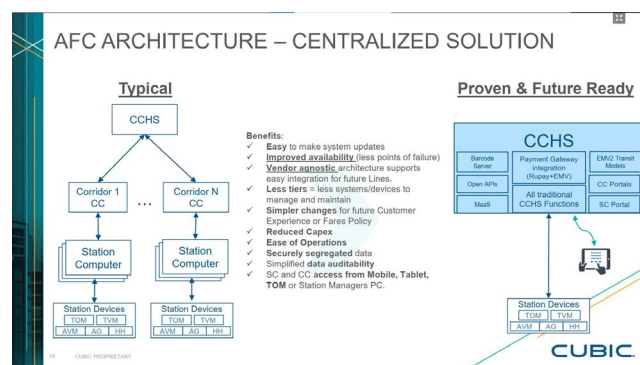
- They have vendor payment portal VPP which is seamless interface that simplifies transaction between vendor and DMRC, allowing vendors to raise invoices and DMRC to process payment corresponding to these invoice invoices via this portal
- DMRC also has contract manpower management system CMMS to register contract manpower being employed by various vendors throughout the project being implemented
- There are several other applications which DMRC uses such as SAP ESS portal, which is Employee Self Service Portal to update employee data by themselves

Mr Manod Jinnuri from Cubic Transportation System gave presentation on Proven and Future ready Innovations. He introduced cubic transportation system, which is a world leader providing automated payment systems and integrated transport systems. Cubic transportation focuses on the need to coordinate and integrate increasingly disparate modes. Using the examples from several cities, Mr Jinnuri explained how Cubic Transportation aims to create frictionless experience and helps



in increasing ridership thus making public transportation inclusive. They focus on traveller's need, better user experience, transport agencies need, innovation and technology. Mr Jinnuri explained four main solutions used by Cubic Transportation:

- First is the Account Based Ticketing (ACB) which can incorporate NCMC initiatives taken up by various cities in India. This can include cEMV, model2, and closed loop account-based cards
- The second solution is using the Automatic Fare Collection System Architecture in order to reduce and remove potential failure points
- The third solution is leveraging cloud solution for IT, i.e., shifting the AFC to the Cloud will allowed to scale



up the customer requirement based on their ridership. The cloud solution are better for security of data and help in saving the corporations' capex. It is an added advantage that they're also government approved

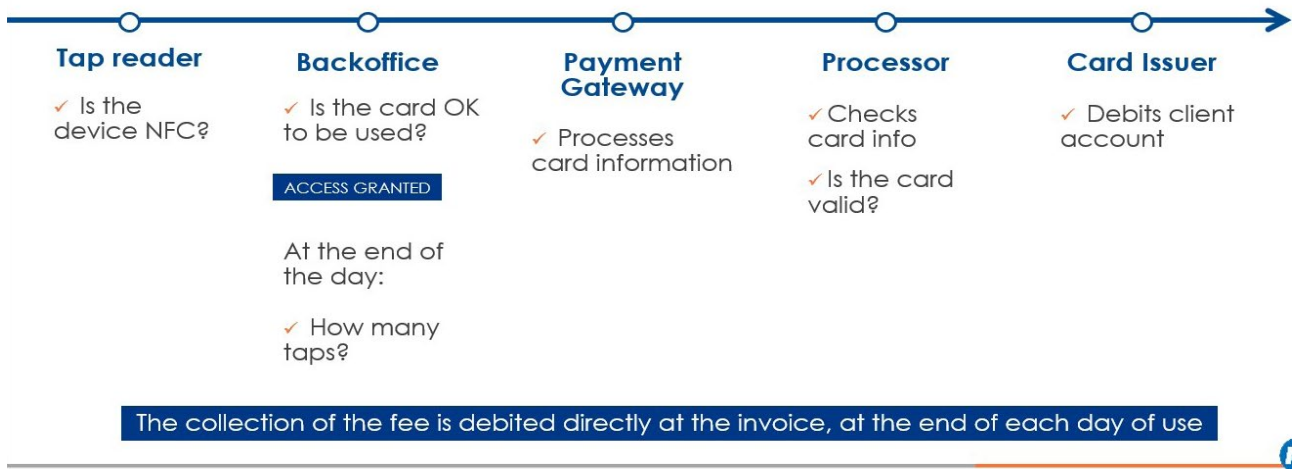
- The next step is the mass implementation of the technology, i.e., a cloud based platform for interoperability between transit service providers, retailers, and public and private and thus providing people centric door to door travel options. This is done to increase the ridership, revenue and provide seamless integration of first and last mile travel. The end to end journey is paid as a single charge to enhance customer experience across all channels

Ms Simone Pfeil, Head of Marketing, Metro Rio made a presentation on contactless payment at Rio de Janeiro metro systems. She introduced the metro Rio having 3 lines with 41 stations across the city of Rio. 85% of their customers are daily smartphone users, thus showing huge potential for digitalisation.

- Before 2017, Metro Rio only used to issue tickets through cash at Ticket Vending Machines (TVMs). In 2017, they introduced debit and credit card facility at TVMs and introduced contactless payment in partnership with Visa in 2019. This payment is done using a tab reader which identifies an NFC Card while the back office checks the card access and then the access is granted. The Gateway processes card information the processor checks the card and if it's valid then the account is debited
- While implementing the technology, they faced several challenges in the technology adoption such as lack of awareness amongst customers on how to use the technology. To rectify this, they had to customise the system and install new technology that plug into the turnstile and read the NFC cards. The implementation was done using a pilot project with 50 people using NFC cards and testing. This test was monitored and a chat box was created for the same for reporting errors, and troubleshooting

> MetrôRio's Contactless Payment

How it works



- Since people didn't understand the technology educational and advertising campaigns were created for launching it. Based on the campaigns, the system was seen as a success. Currently one in every 19th customer uses the NFC Card for the metro system
- In conclusion, the implementation of project improved the customer journey immensely, it lowered the selling costs, it brought about new turnstile validators because of modern NFC technology, and it brought in successful partnership with Visa, MasterCard, and local cards, along with several other technological partners

SESSION III - FUNDING AND FINANCING INNOVATION IN URBAN RAIL SECTOR

The second session witnessed discussion on funding and financing innovation in urban rail sector with presentations from different case approaches.

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Session III: Funding and financing innovations in urban rail sector

10 March 2022 | 14:00 IST | 09:30 CET

MEET THE SPEAKERS



ANGELA KHOO
Deputy Director
Public Transport Council
Singapore



RAHUL NILOSEY
Chief Financial Officer
L&T Metro Rail
Hyderabad



CHIRAG DAULATANI
Vice President
KfW IPEX Bank



JAE HYUNG KWON
Head South Asia
MIGA



JULIAN WARE
Head of Major Project
Funding Transport
for London (TfL)



HILJA BORIS IGLESIA
Knowledge & Innovation
UITP

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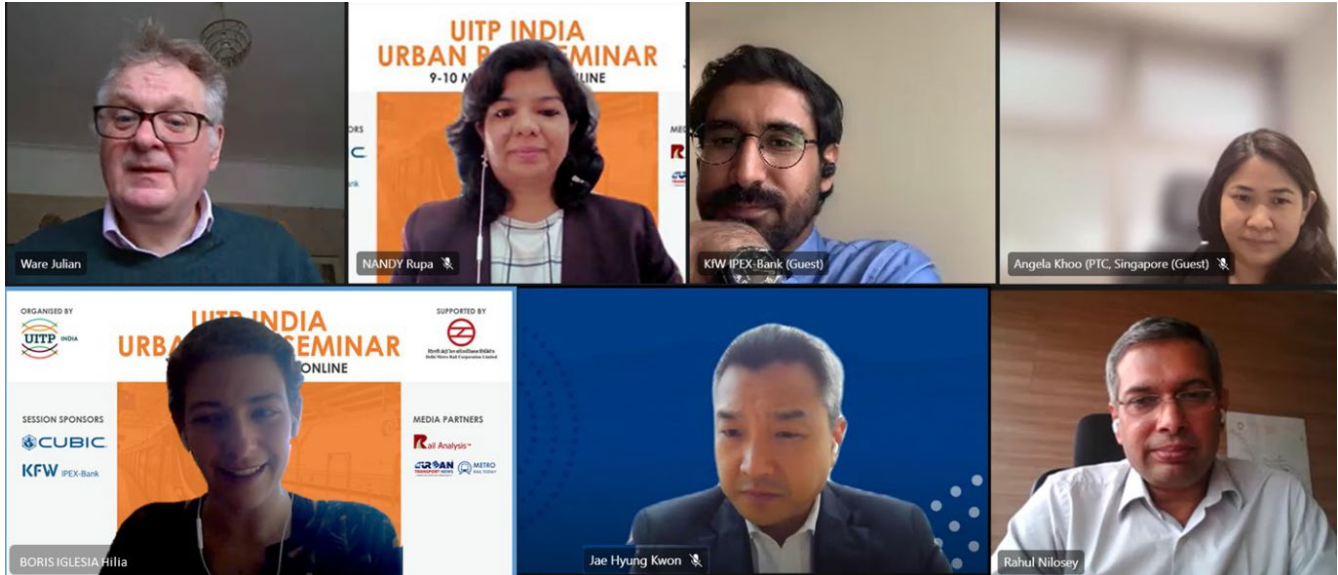


MEDIA PARTNERS



PUBLIC TRANSPORT FUNDING AND BUSINESS MODEL, SINGAPORE

Ms Angela Khoo, Deputy Director - Policy and Regulations from Public Transport Council (Singapore), a statutory body under Ministry of Transport presented the brief overview of Singapore Rail and commuter statistics. According to 2020 figures, Singapore has high public transport commuters with an average daily passenger figure of 5 million. However, after COVID 19, the average daily passenger figure dropped to 2.2 million and there have been rising costs



► The second technical session discussion on funding and financing innovations in urban rail sector

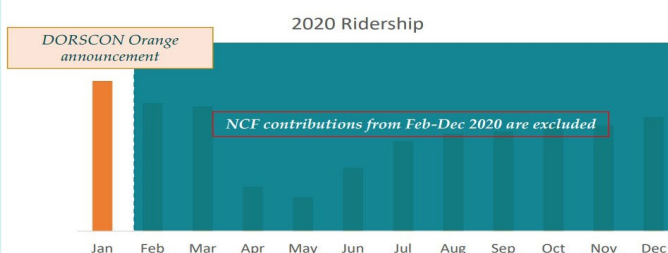
to maintain service reliability, safety standards and intensified cleaning measures. Following are the updates undertaken by Singapore to overcome the financial impact faced by public transport operators:

- In 2020 and 2021, the Government provided broad-based support measures to help cushion the financial impact faced by public transport operators. Currently, the fare adjustment formula (valid from 2018-2022) is guided by 0.5 Core Consumer Price Index + 0.4 Wage Index + 0.1 Energy Index – 0.1% Productivity

Extraction + Network Capacity Factor (NCF). The NCF factor was introduced in 2018 and measures the demand and supply of commuters in the rail systems. However, the factor is not designed to track fluctuations in public transport demand and supply during exceptional periods such as COVID-19 pandemic. As a result, the Council decided to exclude all the NCF contribution from the months of February 2020 to December 2020 from the fare formula computation. This would buffer the impact of drastic decrease in ridership figures

➤ MID-TERM REVIEW OF NETWORK CAPACITY FACTOR (NCF)

- As NCF is not designed to track fluctuations in public transport demand and supply during exceptional periods such as the COVID-19 pandemic, the Council has decided to exclude all NCF contribution from the months of February 2020 to December 2020 from the fare formula computation.



Index	Percentage Change	Weightage	Value in Fare Formula
Core CPI	-0.2%	50%	-0.1%
Wage Index	1.4%	40%	0.6%
Energy Index	-32.8%	10%	-3.3%
Productivity Extraction	0.1%	-	-0.1%
Network Capacity Factor	0.7%	-	0.7%
2021 Fare Adjustment Quantum Generated by Formula (A)			-2.2%
Quantum Rolled-over from the 2020 Exercise (B)			4.4%
2021 Fare Adjustment Quantum (A+B)			2.2%



- Other than fare, the Land Transport Authority (LTA) and SBS Transit Ltd (SBST) have recently concluded the review of the New Rail Financing Framework (NRFF) for the Downtown Line (DTL). This would strengthen both profit and risk sharing mechanism to reduce commercial volatility for the operator. The government and the operator will co-share the revenue risk

FUNDRAISING THROUGH BONDS AND COMMERCIAL PAPERS

Mr Rahul Nilosey, CFO, L&T Metro Rail Hyderabad started with a brief introduction on metro network system of Hyderabad. The city has a fully operational 69 kilometers of metro network in the heart of the city spread across three corridors with a daily ridership figure of 400,000 before the pandemic. L&T Hyderabad has a 60-year concession agreement with the Government of Telangana which was signed in 2010, and started in mid of July 2012 based on Design Build Finance Operate Transfer Model. Taking his presentation forward, Mr. Nilosey emphasised on the need for refinancing.

- The rationale behind looking for refinancing models was to reduce the cost overruns, reduce cost of debt, defer out scheduled repayments of existing debt and to lower leverage and interest cost to make the project more attractive for additional equity infusion from potential investors

> Need for Refinancing

- Reduce leverage in the project in light of the post pandemic risks
- Defer out scheduled repayments of existing debt in order to conserve cash
- Reduce cost of debt
- Lower leverage and lower interest cost helps make the project more attractive for additional Equity infusion from any potential investor

- Some of the options available for refinancing included refinance through new set of banks, implementing an InvIT structure, and refinancing through capital markets. However, due to stringent guidelines for loan financing and banking structure in India, and high traffic risk passed directly onto the concessionaire, loan refinancing and InvIT was not seen as an optimal solution to implement.
- Therefore, refinancing through capital market i.e., bond market and selling commercial papers was the only viable option available. The key strategy for sell-

ing bonds included keeping short tenors and spread-out maturities over 3-5 years and further targeting shorter maturity through selling commercial papers. Additionally, the debt was classified as serious lender market as part of the concessionaire agreement, and thus it gets preference before the equity holders and provides comfort to the investors. L&T Hyderabad successfully raised \$1.15 Billion in the form of debentures with 3,4 & 5 years maturities and raised \$600 million in the form of Commercial papers with various maturities on the same day

> Outcome

Largest single-day fundraise by a Corporate in the Indian Debt Capital Market

- Raised \$1.15 Bn in the form of Debentures with 3, 4 & 5 years maturities
- Raised \$600 Mn in the form of Commercial Papers with various maturities
- Refinancing completed successfully on the same day

Annual cash flow savings of almost \$200 Mn in the near term

ALTERNATIVE COMMERCIAL FINANCING SOLUTIONS FOR MOBILITY AND TRANSPORT

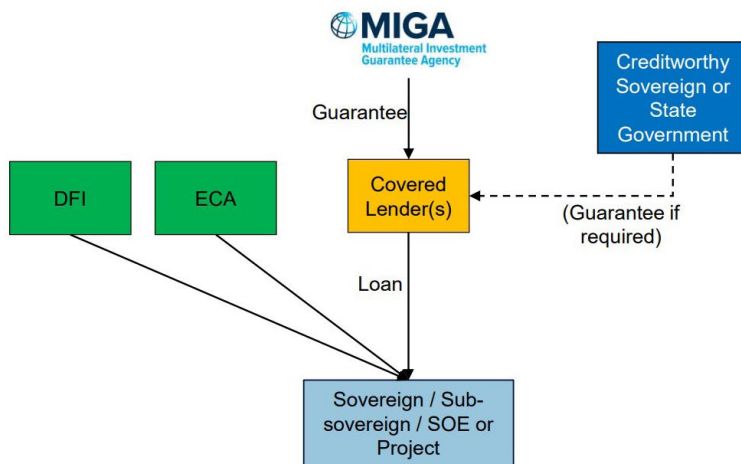
Mr Chirag Daultani, KfW Bank discussed the alternative commercial financing solution for mobility and transport segment. KfW IPEX-Bank is a specialist financier in project and export finance globally, and can support mobility and transport financing either in the form of equity or debt financing. The major factors that influence the finance decision is tenant and the size of financing.

- Mr. Daultani discussed in detail the pros and cons of various financing options such as bond market, commercial banks, multilateral banks and export financing structure. For instance, bond market can provide significant volumes and long tenor of debt but these are inflexible structures, with timing sensitivity and only for operational terminals. Commercial banks are typically more flexible with respect to the financing structure with a quick approval process. However, sometimes they are not competitive as the other players in the market, with reduced liquidity for longer tenor deals and are difficult for greenfield projects

Mr Jae Hyung Kwon discussed Multilateral Investment Guarantee Agency (MIGA), a part of the World Bank Group as one of the feasible financing options for transport sector. MIGA provides guarantees to foreign direct investors to mobilise investments into developing countries and comes up with some value additions such as cap-

> MIGA backed Financing Structure

Schematic of a typical MIGA Credit Enhancement Transaction



- ❖ **MIGA Credit Enhancement solution:** MIGA can credit enhance loans at the sovereign, sub-sovereign (municipal/state government) or stand-alone SOE level.
- ❖ **Lenders:** MIGA's guarantee holders are overseas lenders / investors (in case of bond issuance)
- ❖ **Borrower:** can be a creditworthy sovereign / sub sovereign or SOE or a project with a payment guarantee from a sovereign or a sub-sovereign.
- ❖ **Partnership with ECAs and DFIs**
MIGA has worked closely with ECAs and DFIs as joint / parallel lenders to the same projects.

KfW IPEX-Bank Alternative Commercial Financing Solutions for Mobility and Transport - March 10, 2022

ital relief provided to banks allows for extension of tenors and competitive financing terms, wider financing options are available for the borrower and attractive overall borrowing costs, especially if the project(s) is considered to be climate friendly or aligned with the Paris Agreement

- Mr Kwon also discussed the advantages of MIGA-financing from the borrower's perspective. MIGA is recognised by Basel Committee as a highly-rated multilateral, and thus lenders quote attractive rates reflecting the lower risk of a MIGA-covered loan. MIGA financing facilities are available in freely convertible currencies such as USD, EUR, GBP, JPY and the borrowers also have the flexibility to diversify their funding source and avoiding stressing any one particular source of financing

IMPLEMENTING LAND VALUE CAPTURE, TRANSPORT FOR LONDON

Mr Julian Ware, Head of Corporate Finance, Transport for London (TfL) discussed the achievements of land value capture in London and further studies in the same regard. Land value capture which operates on two key economic principles i.e., taxation and ownership has generated interest in TfL. Taking the example of Crossrail 1

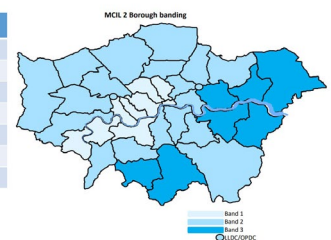
project, its nature and economic importance for London, Mr Ware discussed the land value capture in London.

- Britain has a taxation system for business properties i.e., commercial shops, offices, restaurants which are used for rental purposes. Through stakeholder consultation between business properties and politicians, there was an agreement to fund the London Cross-rail project through paying extra amount on business properties. The tax is called Business Rates Supplement (BRS) and is charged at 2 pence per £1 of rateable value (2%) to existing commercial developments with rateable value (annual rent charge) of originally more than £55,000, now £70,000. BRS contributed to crossrail through repaying borrowing amount of

MCIL 2: Rates

MCIL2 Charging Band	Development Type	MCIL2 rate (£ per sq. m)
Band 1	All	80
Band 2	All	60
Band 3	All	25
	Office	185
Central London/ Isle of Dogs	Retail	165
	Hotel	140
All	Health/education	nil

- A tax on development
- Introduced 2012
- Has raised nearly £1 billion; now at £130 million pa



EVERY JOURNEY MATTERS

around £3.5 billion for the project, made direct contributions of approx £0.6 billion and supports additional Greater London Authority (GLA) borrowing for additional spending

- Introduced in 2012, a levy is imposed on new developments based on per square metre rate. The levy is a way of recovering a part of increase in property prices due to better transport systems. There are different rates for municipalities based on the location around the transportation system

- Lastly, Mr Ware concluded that the current mechanisms doesn't capture land value uplift effectively and of the estimated £61.5 billion of uplift estimated to be generated by Crossrail 2, only approx. 2% is captured through overstation development (OSD) and Mayoral Community Infrastructure Levy (CIL). However, cities depending on their situation can take pragmatic steps to best capture the land value system and further improve the transport infrastructure

SESSION IV - DIGITALISATION IN OPERATION AND MAINTENANCE OF URBAN RAIL

In the last session on Day 2, speakers outlined the importance of digitalisation in various aspects of railways including monitoring of project, operations, automation, and train control system.

ORGANISED BY



UITP INDIA URBAN RAIL SEMINAR

9-10 MARCH 2022 | ONLINE

SUPPORTED BY



Session IV: Digitalisation in Operations & Maintenance in urban rail sector

10 March 2022 | 16:05 IST | 11:35 CET

MEET THE SPEAKERS



KIM HUNG LEE
General Manager
MTR, Hong Kong



PAWAN KUMAR VERMA
Joint General Manager-IT
Mahametro



AMANDINE MOUTTE
Mission Manager
RATP Group



MICHAEL RUFFER
Chief Technology Officer
VGF, Frankfurt



DARIA KUZMINA
Knowledge & Innovation
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SMART RAILWAY OPERATION

Mr Kim Hung Lee, GM, Mass Transit Railway (MTR), Hong Kong talked about the impact of technology on various aspects of rolling stock fleet management. MTR is currently operating 2300 train cars and there are 99.9% on-time passenger service. He discussed about the usage of Artificial Intelligence (AI) and data analytics in their business. There are three strategic level that MTR is looking into under their smart railway journey.

- First one is infrastructure, followed by Data analytics and application. The infrastructure is important as it act as enabler to get all the useful data from differ-

ent levels of operation and maintenance. MTR is deploying IoT sensors and applied Quick Response (QR) code on all major assets combined with wi-fi to transfer and store data. These infrastructures are placed at the stations as well as on other locations and data is stored in the cloud platform. The data collected is further analysed to deliver services in a better way for maintenance and operations

- Different applications are used for mobility, operation, and maintenance. The users can locate the shops, escalators, and automatic fare collection machine. The daily maintenance data is collected and processed to



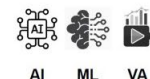
► The final session discussion on digitalisation in operations and maintenance in urban rail

Smart Rolling Stock Fleet Management

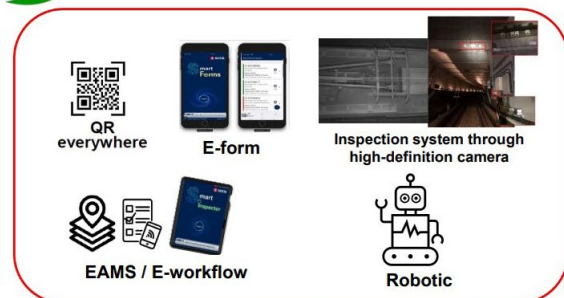
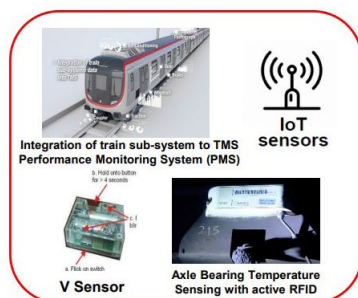
Application Level –
Smart Maintenance for
Management of Rolling Stock
Fleet through **Prescriptive
Maintenance Approach**



Data Analytic Level –
Enabling online platform for
trend analysis powered by
AI & Data Analytic



Infrastructure Level –
Data gathering via 4G/5G
and wifi from routine
maintenance data and in-
service train performance
monitoring devices



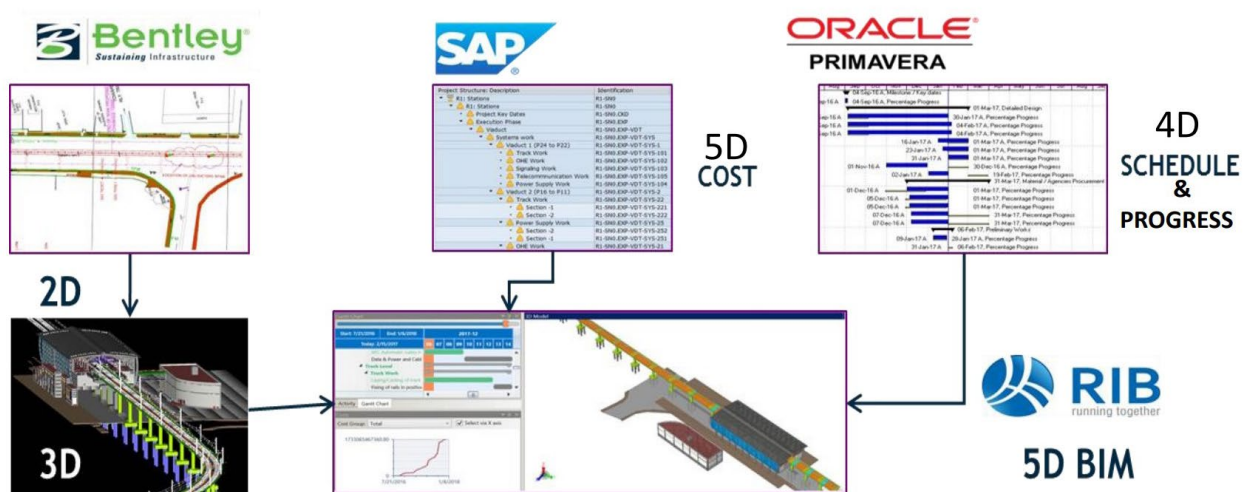
determine predictive and prescriptive maintenance. The aim is to prevent failure by predicting it in advance

- The key enablers to achieve better reliability performance in managing rolling stocks fleet are i) AI and Data Analytics ii) Robotic and Automation iii) Digitalisation and Performance Health Monitoring. In smart train planning, they are optimising train usage between over-hauls and improve scheduling. AI is helping depot guide to schedule trains and depot person can see individual train statistics
- In Robotics and Automation, underframe integrity and inspection are done by robots. Pantograph monitoring system is done using high speed camera to detect condition and there is also axle bearing monitoring system which can detect the change in temperature

Mr Pawan Verma, Joint GM-IT, Maharashtra Metro Rail Corporation (Mahametro) spoke on the different Building Integrated Modelling (BIM) available and their application in rail projects.

- The 5-D BIM includes project planning, design and operations including time and cost overruns. It is five-dimensional visualisation of any project that consists of budgetary and cost considerations. The Maha Metro on boarded all the authority engineer, consultants, contractors, and internal stakeholders to work on the common data environment and single digital platform
- An integrated project management software is necessary to address the challenges of design change, delays in regulatory approval, coordination issue with

➤ 5D BIM @ Maha Metro : One project one platform One



stakeholder and seamless transfer of project to operation and maintenance team. It helps in reducing time overrun as everything is on single platform and change can be tracked digitally. The 5-D helps in reducing document errors and omissions, reduced rework and construction cost, reduced project duration and fewer litigations. The total life cycle savings is around 17% for entire project cost using 5-D BIM. Out of this, 80% of cost saving is observed in operations and rest in design & construction

- Bentley is used for 2-D and 3-D modelling whereas SAP is used for costing & dashboarding, Primavera for scheduling & progress and RIB for simulations of 5-D visualizations of stations, offices, and viaducts. Maha Metro has implemented SAP & ERP for preventive plant maintenance where they have created all

job cards online. The real time SCADA system is also implemented. The job can be created, updated and closed online after repair

- Maha Metro has created 1,00,000 assets comprising of point and linear asset. There are 12 categories of stock e.g., rolling stock, signalling, track etc. The asset location, properties, OEM and specifications detail is maintained in Bentley 3-D model. The savings achieved using digitalisation in the project is 15-20% of total savings in the initial six years and 80% of saving in 6-50 years of operation, maintenance, and renewal

Ms Amandine Moutte, Project Manager, RATP started with organisation history in automation over the past 70 years. The first trial with automated driving started in 1952 and by 1972, 90% of the Paris metro lines have

> Asset up to Least Replaceable Unit (LRU) - e.g. Point machine

Functional loc.	N01-104-DNL-SIG-DXL-PTM-0P01D	Valid From	11.09.2018
Description	Point Machine- 0P01D S700k		
N01-104-DNL-SIG-DXL-PTM-0P01D Point Machine- 0P01D S700k			
	14,576.000	14,576.000	0.000 M
230000001	POINT MACHINE S700K		
	14,576.000	14,576.000	0.000 M
357	Point machine Support	L	1 PC
350	Keep-and-detect slide	L	1 PC
352	Limit switch	L	1 PC
354	Detector slides	L	1 PC
358	Throw (drive) rod	L	1 PC
359	Claw lock bar	L	1 PC
360	Claw lock	L	1 PC
361	Locking claw	L	1 PC
362	Appendix for claw lock	L	1 PC
363	Support plates	L	1 PC
364	Claw lock box	L	1 PC
366	Lower detection square	L	1 PC
367	Lower detection bar	L	1 PC
368	Tensor for detection bars	L	1 PC
369	Upper detection bar	L	1 PC
370	Upper detection square	L	1 PC
230000032	Motor Assembly		
343	Motor	L	1 PC
344	Pinion	L	1 PC
345	Intermediate gear wheel	L	1 PC
346	Gear wheel	L	1 PC
230000044	Throw bar Assembly		
355	Throw bar	L	1 PC
356	Notch of throw bar	L	1 PC

✓ In SAP, asset breakdown structure is defined until LRU.

✓ While defining LRU, asset is broken down into assemblies, sub-assemblies upto individual components.

Least replaceable components of Motor Assembly

automated driving. In 1998, Paris line 14 enters service as the first high-capacity automated metro line in the world. In 2012, automation of Paris oldest and most heavily used metro line was completed without significant traffic interruption

- There are four possible grades of automation. GOA1 automation is controlled manual driving, GOA2 is semi-automated control with driver, GOA3 is automated driving with on-board staff and GOA4 is fully automated driving. Even during the automation process, the focus is always passenger with minimal disruption in services. The automation of Line 4 in Paris improved the service quality and capacity by adding more train automatically
- The Line 4 automation was combination of five sub projects and each sub project had different sets of challenges. These were 100-year-old lines with three different generations of automated rolling stock. One of the challenges was to maintain headway of 105 seconds during automation

- The first sub-project was infrastructure upgradation. The automation of old lines also meant sensitive infrastructure and specific works to reinforce them. The infrastructure upgrades were led in strong coordination with maintenance team. The second set of projects was platform and platform screen doors. It was decided to install it on all driverless lines and installation was done on night. The third sub-project was automation. The unattended trains were operated by a CBTC system including a new operational control centre. The audio-visual means were also modernised. The fourth sub-project was rolling stocks and the fifth sub-project was change management
- The metro automation is a proven, scalable, and adaptable. But in case of brownfield project, there is complexity in design and execution. The emphasis should be on safety specially during automating existing line

Mr Michael Ruffer, Chief Technology Officer (CTO), Verkehrsgesellschaft Frankfurt (VGF) talked about communication-based train control (CBTC) in brown-field application. Frankfurt has 758 thousand inhabitants with approximately 700 thousand workers and 387 thousand commuters per day.

> The automated system



- The Line 1,2,3 and 8 are most requested lines. There was an urgent need for expansion on given grid and due to Covid-19 commuters needed more space around them. This meant increasing capacity and simultaneously requiring more and larger trains. The network extension and updated equipment's were installed. There are 263 vehicles under light rail vehicle

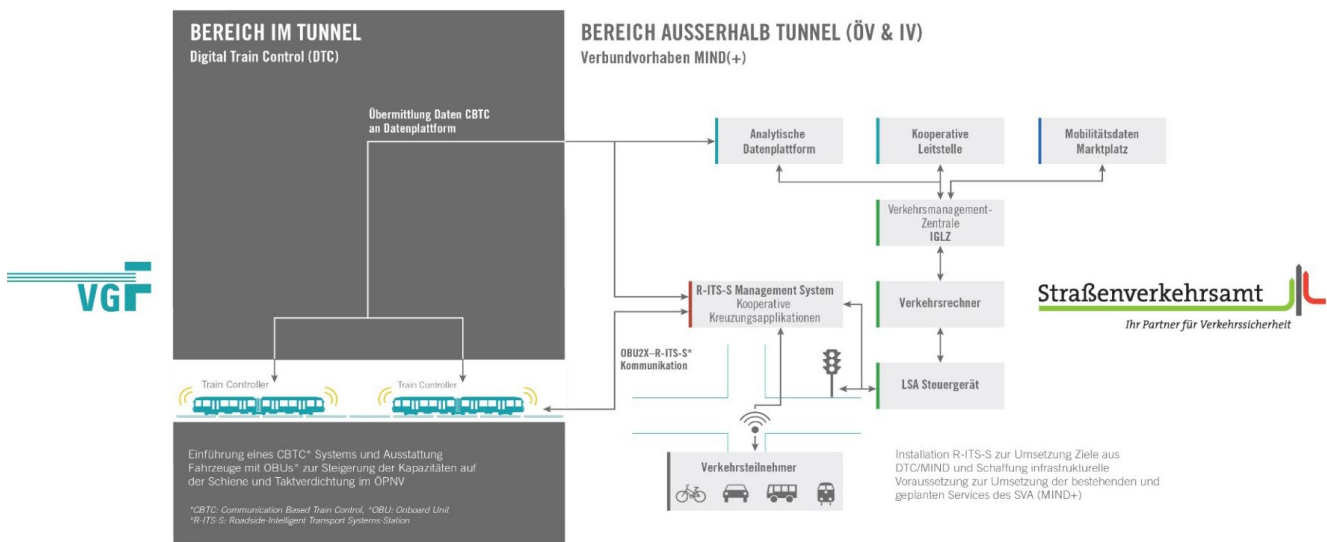
and 112 vehicles under tram. Automatic Train Protection is realised by punctual train control

- From punctual train control perspective, there were only limited headway. By observing the trends worldwide, it was decided to implement communication based control system (CBTC) in tunnels as well as surface based rail system. There were three steps under “Digital Train Control System Frankfurt”. The first step was to have CBTC as a new digital LRV ATP system. The second step was extending CBTC on surface for LRV and TRAM without ATP. The last step was the connection to traffic lights and protections for integrated traffic control
- DTC implementation on the street is equal to having CBTC along with MIND plus. There is need to do the integration of traffic light systems. Based on the data collection under DTC, it will be decided to increase the focus either on rail bound public transport or street bound public transport. The tender was started in 2021 and remained upto end of 2021. The start of CBTC migration vehicles will be by June 2025 is the first major milestone



© DMRC

> DTC = CBTC + MIND(+)



Note: The presentations and recordings for UITP Urban Rail Seminar can be accessed via the following link: <https://mylibrary.uitp.org/ListRecord.htm?list=folder&folder=1382>.

PROGRAMME OF THE SEMINAR

9 MARCH, 2022

INAUGURAL SESSION

14:00 – 14:40 IST

Moderator: Rupa Nandy, Head of UITP India

- Opening Remarks – **Mohamed Mezghani**, Secretary General, UITP
- Welcome Address – **Dr Mangu Singh**, Managing Director, Delhi Metro Rail Corporation
- Vote of Thanks – **Vikas Kumar**, Director Operations, Delhi Metro Rail Corporation

PLENARY SESSION - COVID-19 RECOVERY AND FINANCIAL CONCERNS FOR THE URBAN RAIL SECTOR

14:40 – 16:00 IST

Plenary Session: Covid 19 recovery and financial concerns for the urban rail sector

Moderator: Lisa Rakhaylova - Project Manager, KfW IPEX Bank

- **Vinay Kumar Singh**, IRSE, Managing Director, National Capital Region Transport Corporation
- **Sujatha Jayaraj**, IRAS – Director Finance, Chennai Metro Rail Limited
- **Alvaro Guzman**, Head of Management Control, Metro de Madrid
- **Flavio Chevis**, Chief Executive Officer, Addax, Brazil

SESSION II - TECHNOLOGICAL INNOVATIONS IN URBAN RAIL SECTOR

16:05 – 18:05 IST

Moderator: Eleonora Pazos , Head of UITP, Latin America

- Use of Technology to improve customer experience – **Iori Mori**, International Affairs, JR East
- Cybersecurity and Digital Initiatives in DMRC – **Sajeev Maheshwari**, General Manager IT, Delhi Metro Rail Corporation
- Technological innovations driving current & future trends of AFC – **Manod Jinnuri**, Director Business Development, Cubic Transportation Systems
- Metro Rio's contactless payment – **Simone Pfeil**, Head of Marketing, MetrôRio

10 MARCH, 2022

SESSION III - FUNDING AND FINANCING INNOVATION IN URBAN RAIL SECTOR

14:00 – 16:00 IST

Moderator: Hilia Boris, Manager – Knowledge and Innovation, UITP

- Covid Impact on Investment and Business Model of MRTS, Singapore – **Angela Khoo**, Deputy Director, Public Transport Council (Singapore)
- Fundraising through bonds and commercial papers – **Rahul Nilosey**, Chief Financial Officer, L&T Metro Hyderabad
- Alternative Commercial Financing Solutions for Mobility and Transport – **Chirag Daultani**, Vice President, KfW IPEX Bank & **Jae Hyung Kwon**, Head South Asia, MIGA
- Implementing land value capture: How does it work in practice? – **Julian Ware**, Head of Major Project Funding, Transport for London (TfL)

SESSION IV - DIGITALISATION IN OPERATIONS & MAINTENANCE IN URBAN RAIL

16:05 – 18:05 IST

Moderator: Daria Kuzmina, Manager – Knowledge & Innovation, UITP

- Smart Railway Operation – Rolling Stock Maintenance powered by AI and Data Analytics – **Kim Hung Lee**, General Manager, MTR, Hong Kong
- Building information modelling for faster execution of projects – **Pawan Kumar Verma**, Joint General Manager – IT, Mahametro
- Transitioning to automated metro lines in existing network: Paris Line 4 – **Amandine Moutte**, Mission Manager, RATP Group
- CBTC implementation in brownfield and greenfield projects – **Michael Ruffer**, Chief Technology Officer, VGF, Frankfurt



SPEAKERS

INAUGURAL SESSION



MOHAMED MEZGHANI
Secretary General
UITP



DR MANGU SINGH
Managing Director
Delhi Metro Rail Corporation



VIKAS KUMAR
Director Operations
Delhi Metro Rail Corporation



RUPA NANDY
Head of UITP
India

PLENARY SESSION - I



VINAY KUMAR SINGH
Managing Director
National Capital Region
Transport Corporation



SUJATHA JAYARAJ
Director Finance
Chennai Metro Rail
Corporation



ALVARO GUZMAN
Head of Management Control
Metro de Madrid



FLAVIO ZATERCA CHEVIS
Chief Executive Officer
Addax



LISA RAKHAYLOVA
Project Manager KfW IPEX
Bank GmbH

SESSION - II



IORI MORI
International Affairs
East Japan Railway



SAJEEV MAHESHWARI
General Manager IT
Delhi Metro Rail Corporation



MANOD JINNURI
Director Business Development
Cubic Transportation Systems



SIMONE PFEIL
Head of Marketing
Metro Rio



ELEONORA PAZOS
Head of UITP
Latin America

SESSION - III



ANGELA KHOO
Deputy Director
Public Transport Council
Singapore



RAHUL NILOSEY
Chief Financial Officer
L&T Metro Rail
Hyderabad



CHIRAG DAULATANI
Vice President
KfW IPEX Bank



JAE HYUNG KWON
Head South Asia
MIGA



JULIAN WARE
Head of Major Project
Funding Transport
for London (TfL)



HILIA BORIS IGLESIA
Knowledge & Innovation
UITP

SESSION - IV



KIM HUNG LEE
General Manager
MTR, Hong Kong



PAWAN KUMAR VERMA
Joint General Manager-IT
Mahametro



AMANDINE MOUTTE
Mission Manager
RATP Group



MICHAEL RUFFER
Chief Technology Officer
VGf, Frankfurt



DARIA KUZMINA
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ABOUT UITP

INTERNATIONAL ASSOCIATION OF PUBLIC TRANSPORT (UITP) is the international network for public transport authorities and operators, policy decision-makers, scientific institutes and the public transport supply and service industry. It is a platform for worldwide cooperation and the sharing of know-how between its 1,800 members from 100 countries.

In March 2007, UITP opened its first **Indian office in Bangalore** and in December 2019 in **New Delhi**. The prime objective of the Indian office is to better address the specific needs of regional members as well as the Indian public transport sector and its stakeholders.

UITP in India aims to offer assistance and services to public transport organisations in the country through access to knowledge on national and international technical and policy developments in urban mobility, peer reviews, projects and studies on specific issues of concern.

UITP supports the public transport sector and its development in India by advocacy, knowledge sharing, organising technical trainings, data collection, international benchmarking, etc. There are over 50 UITP members in India.

FOR FURTHER INFORMATION

Rupa Nandy

Head of UITP India

Mob- +91 9811864099

Email- rupa.nandy@uitp.org

Delhi Office

UITP India

Office of Chief Project Manager-5

Delhi Metro Rail Corporation Ltd

Ground Floor, Airport Express
Metro Station, Dhaula Kuan

New Delhi-110010

Bangalore Office

UITP India Regional Office

2nd Floor BMTC

Shanti Nagar Bus Station
Complex, Shanti Nagar

K H Road, Bangalore - 560027

PUBLICATIONS

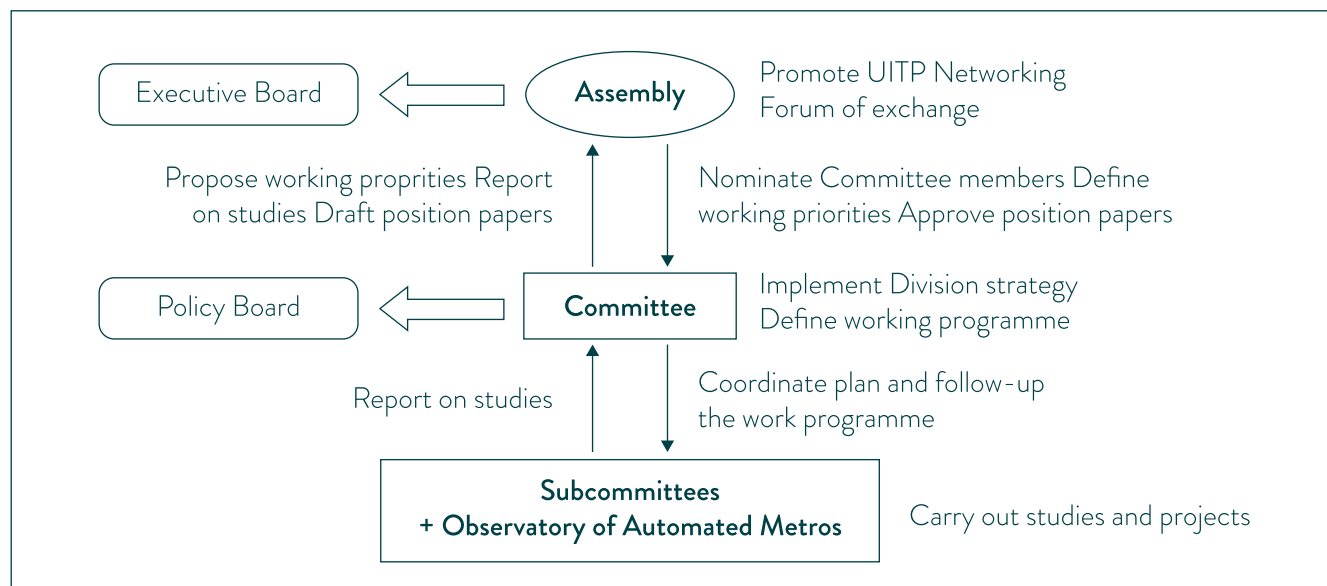
Some key publications from UITP focusing on urban rail are:

- BIM approach for the track asset management of the future – Fixed Installations Subcommittee, [LINK](#)
- Special power requirements in a GoA4 operation – EISS Subcommittee, [LINK](#)
- Grounding system in DC railway – EISS Subcommittee, [LINK](#)
- Railway vehicle dynamics on metro networks – Rolling Stock Subcommittee, [LINK](#)
- Human driver awareness technologies – Rolling Stock Subcommittee, [LINK](#)
- Supporting services for metro operations – Operations Subcommittee, [LINK](#)
- Broken rail in steel wheel automated metros (quick survey) – Observatory of Automated Metros, [LINK](#)
- Demand modelling (quick survey) – Operations Subcommittee, [LINK](#)

ABOUT UITP METRO DIVISION

The **Metro Division** is composed by close to 100 metro operators (and several organising authorities responsible for the planning of metro systems). Any metro operator member of UITP is de facto a member of the Metro Division.

Within the Metro Division, there are several working structures; not all members participate actively in all of them.



The **Metro Assembly** is the meeting that gathers, usually once a year, the main contacts (CEO, technical directors, etc.) of all UITP Metro Division members. In the Assembly, top level Metro Division members share their news and discuss problems at the highest level in a closed, non-commercial environment. Participant members also receive an update on the technical activities developed by the Division in the course of the year and a preview of upcoming working topics, and can propose new working topics, contributing to shape the future of the Division and the metro sector.

The **Metro Committee** is the strategic and executive force of the Metro Division. It plans, coordinates and monitors the work of the four technical Subcommittees and the Observatory of Automated Metros, and prepares the programme of Metro Assemblies and Conferences. This working body is composed by the Chairpersons of the technical Subcommittees, the Observatory of Automated Metros, and a number of regional representatives.

SUBCOMMITTEES AND REGIONAL BODIES

In general, Subcommittees meet twice a year; membership to the Subcommittees is voluntary – each Metro network applies to become a member according to their own priorities.

The technical Subcommittees are:

- Electrical Installations and Safety Systems (EISS) subcommittee
- Operations Subcommittee
- Fixed Installations Subcommittee
- Rolling Stock Subcommittee
- Observatory of Automated Metros

The work of the Metro Subcommittees is complemented by **Metro Regional Platforms** – exchange forums set in each of the world regions to facilitate exchanges at a closer level among members.

Currently there are 3 active regional platforms

- **Asia Pacific Urban Rail Platform (APURP)**
- **International Rail Forum for North America (IRFNA)**
- **Grupo de Rieles de America Latina** (Latin America Rail Group)

For more information on UITP Metro Division activities, please contact Corentin Wauters

Manager, Knowledge & Innovation corentin.wauters@uitp.org

This is an official Report of UITP, the International Association of Public Transport. UITP has more than 1,800 member companies in 100 countries throughout the world and represents the interests of key players in this sector. Its membership includes transport authorities, operators, both private and public, in all modes of collective passenger transport, and the industry. UITP addresses the economic, technical, organisation and management aspects of passenger transport, as well as the development of policy for mobility and public transport worldwide.

This Report was prepared by UITP India.



Rue Sainte-Marie 6, B-1080 Brussels, Belgium | Tel +32 (0)2 673 61 00 | Fax +32 (0)2 660 10 72 | info@uitp.org | www.uitp.org

MARCH | 2022