MARCH | 2018 | VOLUME 18

METRO CUBE

MMRC

ADDING NEW DIMENSIONS

A MUMBAI METRO RAIL CORPORATION NEWSLETTER

MD Speaks

Ms. Ashwini Bhide, IAS

This month we moved to yet another milestone by completing 1000 meters of tunnelling. The second TBM of Pkg 7, Wainaganga 2 began its initial drive at Pali Ground launching shaft, Marol. This TBM will produce 1312 meters of down line tunnel up to CSIA. Godavari 1, TBM of Pkg 5 completed its initial drive at Vidyanagari launching shaft and commenced with main drive. Godavari 2 TBM of Pkg 5 began its initial drive at Vidyanagari north launching shaft. All 17 TBMs are expected to roll under the ground by June 2018. Another critical milestone is successful completion of traffic deck at Marol Naka Station, which is opened for traffic movement. National Safety Week (March 4th to March 11th) was celebrated at all construction sites with various safety initiatives by the contractors to encourage and demonstrate safe working culture at Metro-3.

Land acquisition process from private owners at Kalbadevi & Girgaon stations are now being concluded by declaring final awards for 4 of the 19 properties. 125 provisional agreements with tenants of cessed properties have been signed. MHADA certification of tenants is the most important activity in cessed properties which is now progressing at steady pace. Although MHADA process seems cumbersome, it is time tested process and is in the interest of the PAPs, has to be followed in the complex cases of protected tenants.

On the systems front, MMRC signed contract with Alstom Transport India Ltd. for 25 Kv AC Traction System. The contractor will soon mobilize and start detailed design activities. As the financial year 2017-18 is concluding we are happy to see that the financial targets are met reasonably well. JICA has concluded the loan agreement signing process for ¥100,000 million as committed. This would ensure adequate funds for the next 18 months. Agreement for 1st Tranche for ¥71,000 million was signed on October 2013.

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Team of Chief Minister's Fellows at Metro-3 Site

Content

Tunnel Ventilation System

Metro-3 shall incorporate state of the art and energy optimized Tunnel Ventilation & Environment (TVE) system consisting of Tunnel Ventilation System (TVS) and Environmental Control System (ECS) along with Operational Control Centre (OCC) and Supervisory Control & Data Acquisition (SCADA) systems. TVS and SCADA are mission-critical life safety systems that will protect the passengers during fire and smoke emergencies in the stations /tunnels.

Features of TVE system:

- In emergency cases, TVS & SCADA provide direction for the movement of passengers and control the spread of smoke through ventilation modes.
- Reversible Tunnel Ventilation Fans.
- Interface with fire alarm system.
- Centralized control & monitoring from OCC / Backup Control Centre (BCC).
- 24x7 cooling system for critical operating rooms.
- Power backup provision for emergency operations.

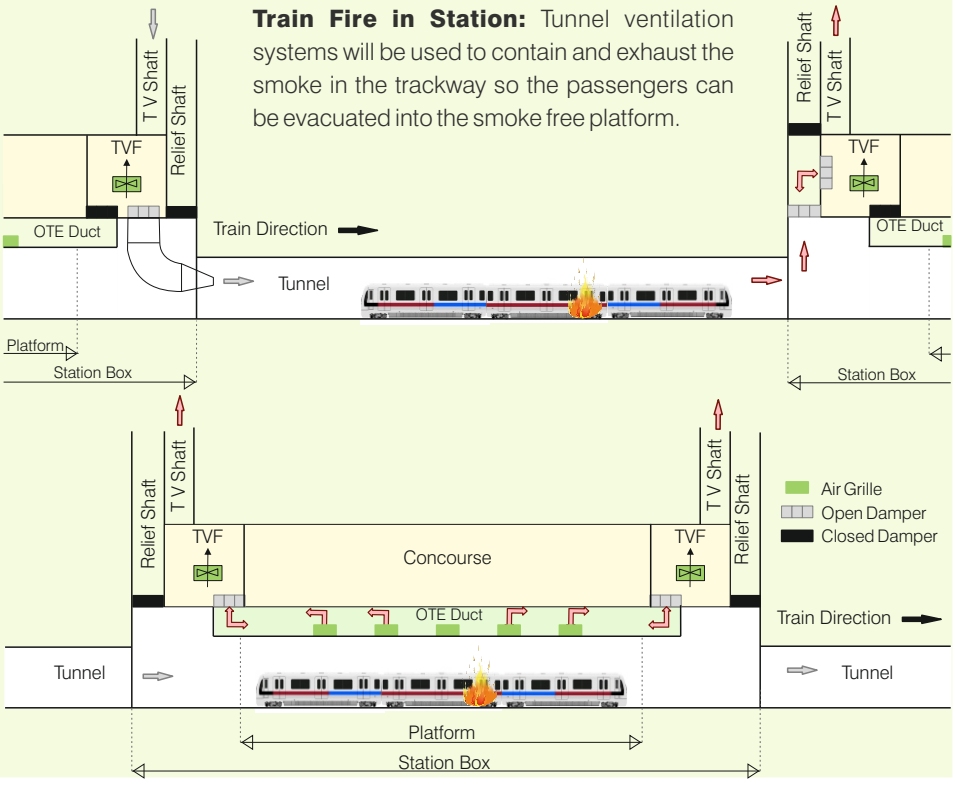
Tunnel Ventilation Systems (TVS):

It Facilitates train service by lowering the tunnel air temperatures during normal and congested conditions and smoke management for train fire emergency. TVS consists of the following components:

- Reversible Tunnel Ventilation Fan (TVF) located at each end of the stations.
- Over Track Exhaust (OTE) above the trackway in the stations.
- Under Platform Air Supply (UPAS) located at the bottom of the trackway in the stations.

OTE will be used to remove train heat from the trackway. UPAS will supply the make-up air for the OTE to minimise exfiltration of conditioned platform air into the trackway, thereby optimizing air conditioning energy consumption. TVFs are mainly for fire emergency and ventilate the tunnel during train congestion in tunnel. TVFs will be used to push the smoke towards one end of tunnel and enable safe passenger egress in the reverse direction of the airflow.

Train Fire in Station: Tunnel ventilation systems will be used to contain and exhaust the smoke in the trackway so the passengers can be evacuated into the smoke free platform.



MD Speaks

Continued from page 1

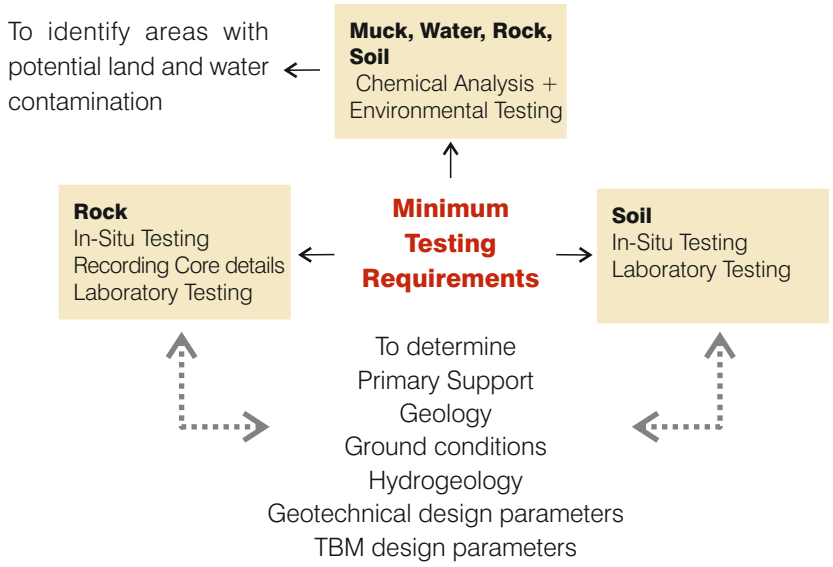
Continuing with our public outreach collaborative program, we had students from Georgetown University, Washington DC, team of engineers and planners from Town Planning and Valuation Department, GoM, Chief Minister's Fellows, members of Project Management Institute (PMI) Mumbai Chapter visiting our work sites at different occasions. MD, MahaMetro Mr. Brijesh Dixit visited construction sites at Azad Maidan, Naya Nagar and Pali Ground. His visit will be useful to adopt learnings Metro-3 on other ongoing Metro works in rest of Maharashtra. I had an opportunity to share my views on integrated transport systems and Metro-3 in a prestigious event *Badalta Maharashtra* organized by leading Marathi daily *Loksatta*. My interactions with the young engineering students from VJTI were an opportunity for us to introduce the challenges of this project to young minds. Mr. Manohar Rajguru, Project Officer, Slum Rehabilitation Society interacted with over 350 women from the families affected by Metro-3 to empower and appraise them on various government schemes to facilitate a sustainable social rehabilitation.

We can see the results of these continuous interactions with the public, media and other influential institutions in form of an increasing positive response from people. We look forward for much more in the coming months.

What Lies Beneath The Earth

Geotechnical Investigation is an important part of any major infrastructure project. The investigation programme has been conducted for Metro-3 which consists of drilling boreholes along alignment and station locations with appropriate field tests and lab tests. Ground Investigation at design and construction stage is done to establish minimum requirements for investigations, design, instrumentation and monitoring for geotechnical, bored tunnel and NATM tunnel works. Boreholes have been marked along entire alignment in accordance with the proposed civil contract packages on the corridor. Contract packages with minimum number of boreholes are listed below -

Packages	Stations	Boreholes
UGC-01	Cuffe Parade to Hutatma Chowk Station	60
UGC-02	CST to Grand Road Station	58
UGC-03	Mumbai Central to Worli Station	65
UGC-04	Siddhi Vinayak to Shitaladevi Station	43
UGC-05	Dharavi to Santacruz Station	47
UGC-06	CSIA Domestic Airport to CSIA International Airport Station	52
UGC-07	Marol to Seepz Station	60



Ground Investigation program shall consider the locations and lateral and vertical extent of the following:

- Major existing structures such as viaducts, bridges, flyovers, underpasses/sub-ways and crossing structures
- Underground water and sewage treatment plants, commercial developments, ancillary structures
- Significant geological features like major faults, shear zones, persistent jointing, mass wasting, old landslide

Construction Challenges:

- Due to proximity to Arabian Sea, Creeks and Mithi River, high ingress of salt and sweet water from jointed basalts and flow contacts can be expected.
- Hard rock / soft rock encounter during TBM operations. Soft rock in NATM tunnel sections
- Probing and pre-excavation (chemical/cement) grouting necessary to control seepage.

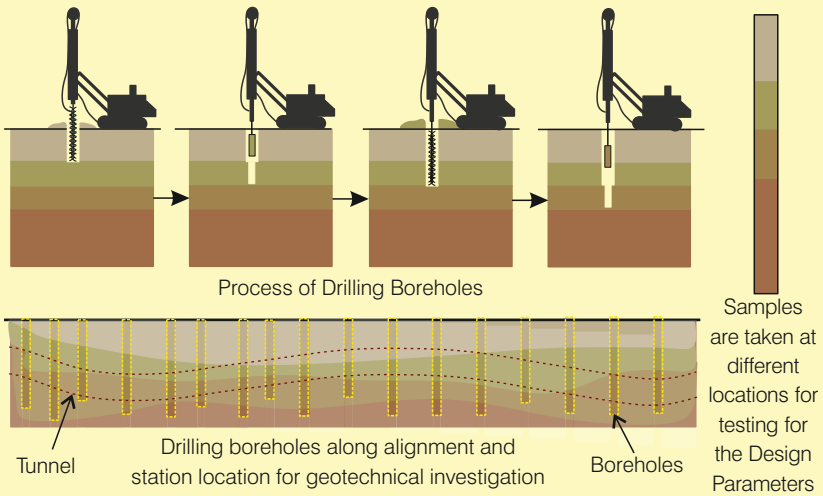
Contract requirements for Additional Geotechnical Investigation (Minimum Requirement):

Stations: Not less than six boreholes per station

Cross-Passages: Minimum two boreholes per cross-passage

Tunnels: Borehole centre to centre spacing not greater than 250 m

Additional GI: Locations with unusual features such as deep weathering of rock, high piezometric pressures, loss of drilling fluid or very weak ground



Know Your Station - Shitaladevi Station

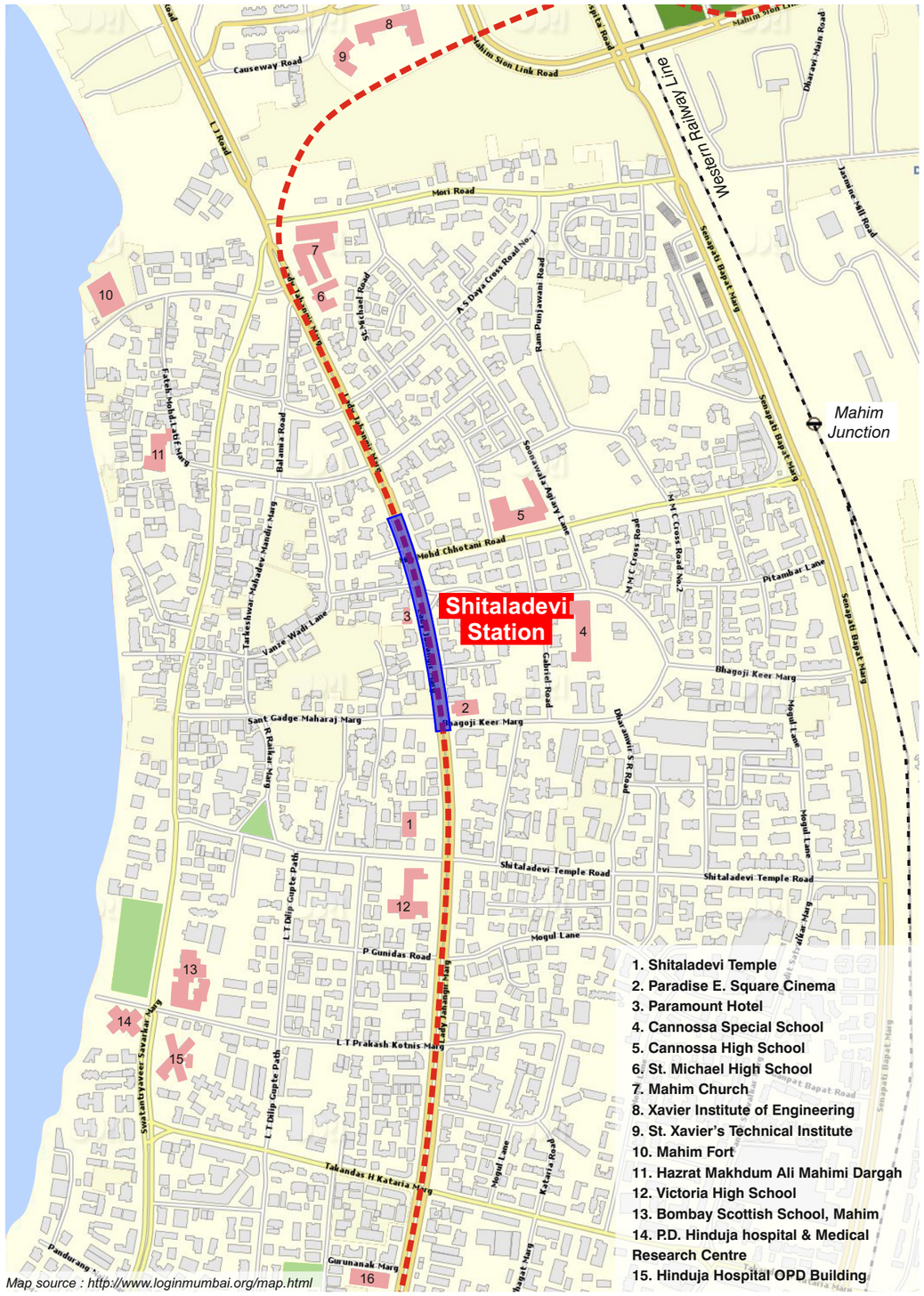
St. Michael Church

Shitaladevi Temple

Hinduja Hospital

Paradise Cinema

Victoria High School



Map source : http://www.loginmumbai.org/map.html

The Shitaladevi Metro Station, 17th station of Metro-3 from Colaba, sits beneath the Lady Jamshedji Road. The station is named after the Shitaladevi Temple, dedicated to Shitala Mata (Goddess) which witnesses thousands of local devotees coming on Tuesdays to offer their prayers. The temple area is specially decorated during Navaratri, a festival dedicated to the goddess.

Mahim was one of the seven islands that originally made up Mumbai. The first inhabitants were fishermen, living in 'Koliwada'. Mahim forms the edge of the Island City of Mumbai and is separated from the suburbs by the Mahim Creek. Bandra is the first Western Suburb across Mahim Creek. Mahim is often considered as the heart of Mumbai and is being served by the Mahim Junction Station on Western Railway Line. The station also caters to harbour line services from Navi Mumbai to Andheri and from CST to Andheri. Metro-3 will enhance this connectivity and ease the journey to many notable places which are a little long way from Mahim Station like, Hazrat Makhdum Ali Mahimi Dargah, Shitaladevi Temple, Hinduja Hospital, Bombay Scottish School etc.

In spite of major rapid transformations and upcoming mega developments in Mahim-Worli stretch, Mahim still continues to be a residential neighbourhood with traditional markets and vernacular Hindu, Muslim and Christian settlements , which makes it exceptional in its own way.

After British acquired Mumbai, they built the Mahim Fort in 1669 here to protect themselves from the Portuguese. Today the fort is almost ruined and is occupied by encroachers and hutments. Causeway connecting Mahim and Bandra was built in 1845 from the money donated by Lady Avabai Jamsetjee Jeejeebhoy, wife of the first baronet Sir Jamsetjee Jeejeebhoy with a stipulation that no toll would be charged to citizens for its use by the government. The causeway is now transformed into Lady Jamshedji Road, one of the major north-south arterial roads connecting Bandra to South Mumbai, which now provides underground way to Metro-3.

Hazrat Makhdum Ali Mahimi Dargah

The 600 years old Hazrat Makhdum Ali Mahimi Dargah is the most noteworthy place of Mahim. It stands on the western side of the Cadel Road and with main entrance facing the east. It is within ten minutes walking distance from proposed Shitaladevi Metro Station which will ease the journey of massive influx of devotees visiting the dargah especially during the annual ten days of urs (death anniversary) every year. The dargah complex, entered through an imposing green gateway decorated with white tracery, has a unique welcoming stance.

Makhdoom Ali Mahimi Shafi (1372 to 1431 A.D) was a saint and scholar of international repute. Mahimi is revered by both the Muslims and Hindus. Mahimi was the first Indian scholar to write an exegesis on the Qur'an. After his demise in 1431, grave later became a dargah (shrine) for devotees.

Other places in the city also bear Mahimi's name, notably the 2.1km JJ Flyover which is the longest viaduct in the country. The Government of Maharashtra named the JJ Flyover after the saint, Qutb-e-Kokan Makhdoom Ali Mahimi Flyover as a tribute to him on 21st May 2005.

Challenge of Hyperbaric Intervention

Health Aspects of Working in Tunneling Operations

Dr. Tarun Sahni is Head of Hyperbaric Medicine at Apollo Hospital New Delhi and Visiting Consultant at SL Raheja Hospital Mumbai. He is founder and Director of Advent Healthcare Pvt Limited and along with his team they have conducted over 500 safe hyperbaric interventions at the Delhi Metro sites. They have worked with Kolkata Metro and conducted a workshop for top executives of the Metro-3 on May 2017.

The city of Mumbai has seen great activity in recent months due to the Metro-3 works. This project of creating an underground tunnel to carry large no of passangers is challenging and need multiple agencies with different skills to work together to ensure smooth and safe project execution.

The role of the medical team is to ensure that the workers are healthy and able to perform their duties. The "occupational health medical officer" looks at the fitness of all employees , the availability of safe food and clean environment and providing medical aid to any illness and injuries which can occur.

The most complex and specialised aspect of medical services in tunnelling is the provision of expert medical help when the cutter head intervention team (CHIT) has to work under "Compressed Air" . This activity is called "Hyperbaric Intervention".

Scott Black, Sr. Operations Manager Commercial Diving & Tunneling Support ASI Marine, Canada states " Putting people in the TBM under pressure is exactly the same as putting divers underwater. Your body feels the same effects, so we run under the same laws of physics for diving. Even though you're not in water, your body is still exposed to that over pressurization," The CHIT (like divers) is exposed to decompression sickness, otherwise known as the "bends". Both, diver and CHIT are breathing air while under increased atmospheric pressure and their tissues absorb gases (mostly nitrogen) from the breathing air. The deeper diver / miner go and the longer he stays there, the more gas his body absorbs. When the diver / miner returns to the surface and the pressure is relieved, these accumulated gases start to leave the body. If the pressure is relieved too quickly, bubbles can form in the tissues. These bubbles in the tissues are the cause of decompression sickness. Nitrogen bubbles can cause joint pain and in extreme cases, impaired brain, spinal cord and lungs function. The presence of an experienced hyperbaric medical specialist is an essential requirement to plan the hyperbaric intervention and decompression schedule of this CHIT.

With safer practice, the incidences of decompression related medical complications are very low and this is the result of adherence to appropriated decompression procedures, acclimatization of workers to pressures and strict medical selection criteria. The rare cases are best treated by the hyperbaric specialists in the onsite treatment chambers, which are a mandatory requirement prior to carrying out hyperbaric interventions.

During Hyperbaric Intervention, compressed air is used to pressurize an area of the Tunnel Boring Machine (TBM) called the "Man Lock" and the area of tunnel in front of the TBM, so that team members can enter the tunnel and carry out inspections, repairs, maintenance or removal of obstruction in the TBM cutter head chamber. This safe ingress and egress from compressed air is the responsibility of the contractor's health and safety team along with the hyperbaric intervention team under the leadership of a doctor experienced in the safe conduct of people into and out of this compressed area. Both teams have to work closely at this time.

Citizen Speaks

Ravindra Awati

Our auther in Citizen Speaks section for this month is specialist for Land Acquisitions, Govt. Laisioning, Mass Communications & Public Relation, Image Building Co-ordination with government bodies and laisioning for ROW. Presently he is working as Senior Vice President (Corporate Affairs), Chowgule Ports and Infrastructure Pvt. Ltd for 10 years. Previously he worked for Reliance Infocom /Communication Limited for 8 years.

The financial capital of our country is choked up in pollution and traffic and people here travel in miserable conditions in huge numbers. There is a major crisis of convenient and comfortable transportation option available today. Metro-3 will be a boon to many such people who are facing daily woes of traveling in chaotic and crowded means of travel. This multi-faceted project will not only change the commuting experience but it will also be responsible for reduction of tons of emissions from vehicles on road. That will further lead to decongestion of roads, reduction in noise pollution and facilitate heritage protection. Environment concern is a major point highlighted in media by activists and citizens which needs to be addressed correctly by informing and convincing them about the many benefits that metro will offer which are ultimately environment friendly.

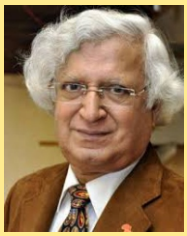
Metro-3 is transforming Mumbai in many different ways. Slums will be replaced by high rise buildings, connecting famous heritage sites will help promoting cultural heritage of the city and facilitate beautification. Mumbai will get its second lifeline after the local trains.

Railway system occupies significant place in the realm of transportation. When compared with other means of transportation system, this particular mode has greater advantages as it can carry a large number of passenger and large & heavy loads to long distances. Since its launch in the field of transportation, railway underwent tremendous changes in term of shape, speed, mode of running and distance what human mind could ever imagine. Among those changes, the most important one is considered to be the emergence and spread of metro rail system.

The word metro actually comes from an abbreviation of 'Paris Metropolitan'. That was quickly abbreviated into metro, which become common word used to designate all subway network. In some cases metro is regarded as rapid transits train system. As of April 2014, 168 metro system in 55 countries are listed. World's first urban underground railway was Metropolitan railway which began its operation on January 10, 1863. Asia's first cities to have subway lines were Tokyo in 1927 and Osaka in 1933. Beijing subway, the first in China began operations. Since 1974, a number of cities in South Korea have developed modern and extensive subway system.

Rapid transits in India consist of Metro, Monorails and light rail system. The first rapid transit system in India was Kolkata Metro, which started operations in 1984. 'Elattuvalapil Sreedharan', popularly known as Metro Man was behind this great effort. The metro rail system in India is popularized and developed due to his amazing efforts and hard work.

Metro-3 is the most awaited and beneficial project as it's rightly said that it's connecting the unconnected areas in lesser time and offering more comfort and security to its commuters. It will be suitable for all the classes with comfortable sitting arrangements, fire safety measures and accident free environment. There should be heavy emphasis on progressive project management. It should be efficient and on time. It should take into consideration the safety, quality, and environmental aspects in detail to ensure smooth functioning and timely completion of work. This being the first underground metro of the city, people have many doubts and misconceptions about pros and cons of this project. The PR activities should be very impactful as it's very essential for the success of the project. It should focus on the building healthy relationship with not just media and local public but also politicians and government authority. Regular public awareness campaigns using slogans and tag lines will help to educate public about the metro work and its need for the future. They should be made aware of the safety precautions and technological advancement this project offers and the fact that metro-3 will set high standards for the new and improved way of transportation like never before. This will upgrade Mumbai in the true sense making it less chaotic and fast paced which will be the new identity of the mega city.



Arun Mokashi, one of the early supporters of underground Metro in Mumbai, passed away on March 12th 2018. Mr. Mokashi was a Civil Engineer, transport specialist and advisor to World Bank for many years and had authored many books on transport infrastructure. He was part of the Comprehensive Transport Study (CTS) for MMR in 2008, and also a leading member of the Indian Experts Groups to restore transportation networks in Afghanistan and Yemen. A strong advocate of large investments in transport sector, need of well integrated mass transit for Indian Metro cities, especially Mumbai and effective institutional coordination between various agencies, Mr Mokashi always emphasized on setting up a Dedicated Urban Transport Fund to ensure sustainability of resources required for building large-sized transport projects.

METRO CUBE

News @ MMRC

MMRC team organized a free Medical Health Camp on International Women's Day for employees & invited female doctors to spread awareness about gynecological problems & lifestyle management through proper nutrition.

Full stretch of temporary traffic decking work completed successfully and is opened for traffic at Marol-Maroshi road, Marol Naka station.

Ms. Ashwini Bhide interacted with students of the premier engineering institute VJTI during a recent programme organised by IGBC online. She highlighted the benefits of Metro-3 & also spoke about technology & construction methods used for the project.

JICA signed loan agreement with GOI to provide Tranche II of ODA loan of ¥100K million to Metro-3 at 1.50% int. pa & 30 years repayment period.

Godavari-1 TBM, pkg-5 completes it's initial drive at Vidyanagri Launching shaft. Main Drive to start soon. Lowering of Wainganga-3 TBM, pkg-7 started at Pali ground launching shaft in Marol. It will soon commence its initial drive towards CSIA International Airport.

Ms. Ashwini Bhide shared tips on being a successful woman leader & her inspirational career journey as an IAS officer and now the MD of Metro-3 at woman achiever event hosted by Ellevate Network Mumbai.

Mr. Irfannooruddin, Professor of Indian Politics, Director, Georgetown India Initiative, Georgetown University along with the students visited pkg-5, to understand the tunnelling work and interacted with the Civil Engineers and officers of Metro-3.

MMRC team organized a free awareness camp on Hygiene and Survival Breast Cancer for more than 350 women from Metro-3 project affected families in orderto promote healthy lifestyle. And also a session on various govt schemes including Self Help Groups was taken by Mr. Manohar Rajguru, Project Officer, Slum Rehabilitation Society.

MD, MahaMetro, Shri. Brijesh Dixit visited Metro-3 construction sites at Azad Maidan, Nayanagar and Pali Ground and commended team's efforts for the fast paced civil construction work & lauded them for following world class safety norms.

MMRC Control Room

Contact us @ 8291751545 to report monsoon related grievances pertaining to Metro-3 construction work.

Website Link

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