



MMRC

ADDING NEW DIMENSIONS

METRO CUBE

A MUMBAI METRO RAIL CORPORATION NEWSLETTER

MD Speaks

Ms. Ashwini Bhide, IAS

The month was full of activities on site, progress in the award of two systems' contracts, some significant developments in Kalbadevi and Goregaon Redevelopment activities and of course our presence in the public forums which received an exceptional attention.

This month, Vaitarana 2 TMB of Pkg 2 commenced tunnelling from CST to Mumbai Central, inaugurated in presence of Mr. Datta Padsalgikar, Commissioner of Police, Mumbai and other senior police officers. Vaitarna-1 TBM of Pkg 2 (CST to Mumbai Central) became the first TBM to commence its main drive (after completing initial drive) from launching shaft at Azad Maidan towards Mumbai Central. Krishna 3 TBM of Pkg 4 and Tansa-1 of Pkg 3 arrived at Mumbai Port and will be soon shifted to respective TBM launching shafts.

Some more awards regarding private land acquisition were passed and the negotiations in other cases are progressing positively. At Kalbadevi and Goregaon, MHADA has started finalising the eligibility of tenants of cess buildings after following scrupulous process of verification. Consultation and negotiations initiated with individual owners of non-cess properties has started yielding good response. The Lands and R&R teams are putting their best efforts in finally getting the required lands for project and station works. We moved a step forward and have awarded two key contracts - L&T was awarded work of Power supply system and Consortium of Alstom Transport India Ltd. & Alstom Transport SA was awarded the works of 25 kV Traction system.

MMRC and GC team had another opportunity to interact with Metro Man of India, Dr. E Shreedharan, Principal Advisor to MMRC. Dr. Shreedharan reviewed the progress of work and also shared his thoughts with the project team. Needless to say, MMRC team is highly privileged to have this guidance from Dr. Shreedharan and in his presence, the inspiration for the team is kept alive.

Continued on page 2



Dr. E. Sreedharan Interacting with Metro-3 team

Content

MD Speaks	1
Automatic Fare Collection System	2
Deep Under The Earth	3
Know Your Station	4-5
Wastewater Monitoring Tunnel Update	6
Expert Speaks	7
News @ MMRC Project Progress Update	8

Automatic Fare Collection System

Automatic Fare Collection System (AFC) is used in a Metro for Fare Box Revenue Collection. It is actually the “Face” of the Metro or any Transport Operator to its “Passengers”. This is a window through which the metro operator not only collects fares from passengers but also manages automatically ticket production, ticket vending and ticket checking functions. This system, being computerized, helps in financial analysis and decision making as the data like; passenger load (distance travel) traffic per direction, peak traffic hours, peak traffic days, traffic in between particular stations and revenues collected per day, per hours and per direction is available. Passengers will be facilitated with a typical AFC system comprise of the following:



1. Contactless Fare Media (CFM): This is nothing but a ticket used by the passenger to enter into the transport system. To ensure faster travel, the fare media has to be “Contactless” which can be just placed on the reader or brought very close to the reader installed on the Gate. Conventionally, Contactless Smart Token and Contactless Smart Card are used as CFM.



2. Automatic Gates: These are Computer Controlled Automatic Gates which are installed at entry and exits of the stations. The area in between the entry and exit gates is known as “Paid Area” and the area outside these gates is known as “Free (unpaid) Area”. A passenger who comes to undertake a journey is supposed to buy a ticket from free area and tap the valid ticket at the gate, which enables him to enter into the paid area, from where he can proceed to the platform for journey. After reaching his destination station the passenger will get the exit by tapping the same ticket at the exit gate.



3. Ticket Office Machine (TOM): Computerized TOM is installed at the station in the free area, from where passenger can buy tokens (tickets) and/or contactless smart cards prior to entering the paid area. Tickets are sold by attendants.



4. Ticket Vending Machine (TVM): TVM are automated machines and are designed such that the passengers are able to use them on their own. They can purchase tickets, make balance enquiry or top up contactless stored value smart cards using valid cash or credit/debit cards of banks.



5. Excess Fare Office (EFO) : Enables passengers to seek information, pay excess fares, get refunds or check the validity and credit value of their fare media. This is normally located near exit gates. The needs of passenger are served by an attendant.

MMRC is planning to charge the fares through tokens, contactless smart cards, QR codes on mobile as tickets. The System will also accept the Common Mobility Card being implemented by MMRDA, as common ticket for all transport operators in MMR.

In addition to this, Portable Recharge, Checking Machine and Add Value Machines are available which can be used to check valid tickets/cards or recharge the same. The back end system of any AFC system consists of Station Computer, Central Computer and AFC Network. All the fare collection equipment are connected in a local area network with a station server controlling the activities of all the machines. These station servers are further linked to the AFC central computer situated in the Operations Control Centre through the optic fiber communication channels. The centralized control of the AFC system helps in operating the entire system like activation of fare media, decisions of opening the gates after reading the ticket, generating reports for revenue, maintenance, operation and security etc.

MD Speaks

Continued from page 1

Our presence in the Magnetic Maharashtra Convergence Summit – 2018 caught attention of several dignitaries, global leaders and visitors including Amabasador of Japan to India Mr. Kenji Hiramatsu, CEOs of multinational investment providers, senior beaurocrats, technical experts and citizen of Mumbai. This was a unique opportunity to showcase Metro-3 on a wider platform and engage with curious questions, appreciation for the team work, encouraging feedback and exchange. With the feedback from many Indian and International experts and dignitaries, it is now reemphasized that the Metro-3 is an indispensable need of Mumbai for sustainable and efficient transit.

I also had an opportunity to apprise the citizens of Vile Parle, an active western suburb, about Metro-3. The curiosity of common people and their intention to support the project is evident in the interactions through such platforms and I am sure, more of such interactions will help successful completion of the project. This month, a team of professors from Government Polytechnic, Final year students from College of Military Engineering, Pune and a team of Auditors from CAG visited our construction sites. We strongly believe that such mega infrastructure projects are grounds to build a resource base for future India. Such visits are instrumental in knowledge sharing and transfer to the young generation and involve them in project building.

Deep Under The Earth

As Metro-3 is the longest and only fully underground metro corridor in India, geological studies form a basis of the feasibility and engineering of this corridor. While tunnelling at majority of the contract packages is initiated, we bring some interesting facts about the World deep under the city, the geology of Mumbai through a series of articles in forthcoming issues.

What is Geology?

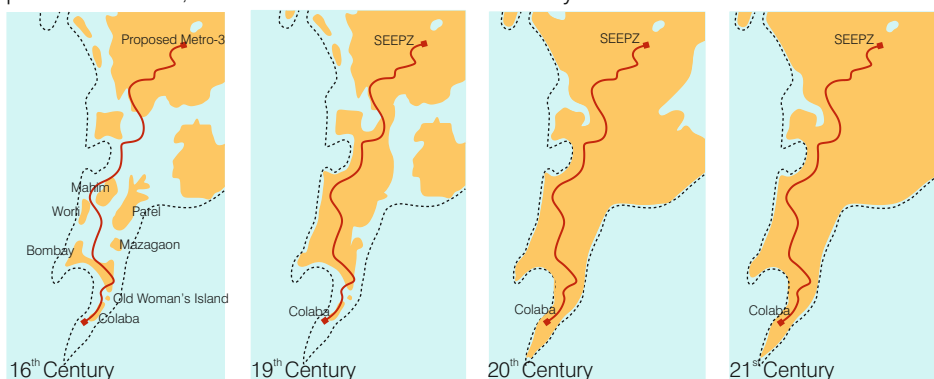
Geology is scientific study of Earth, which deals with physical structure and substance of earth, beneath it's surface and processes by which they change over time. It also provides tools to determine the relative and absolute ages of rocks found in a given location, and also to describe the histories of those rocks. By combining these tools, geologists are able to chronicle the geological history of the earth as a whole, and also to demonstrate the age of the earth. Geology provides the primary evidence for plate tectonics, the evolutionary history of life and the earth's past climates. Geological Survey is done to examine and record the land features.

Need for geological Study:

All types of construction activities require substantial geological investigations since the feasibility of the project depends on the geological condition of the site. It helps to determine the nature, form and cost of the project. Tunnels are underground passage; a detailed and accurate knowledge of rock geology and rock formation around and along the tunnel is of paramount importance in tunnel works.

The island City of Mumbai:

The Mumbai Island originally consisted of seven separate islands, separated from one another by swamps which were 16th century Portuguese territories lying off the west coast of India. These seven islands were lush green thickly wooded and dotted with 22 hills with the Arabian Sea washing through them at high tide. The original island of Mumbai was only 24 km long and 4 km wide from Dongri to Malabar Hill (at its broadest point) and other six were Colaba, Old Woman's island, Mahim, Parel, Worli and Mazgaon. These swamps were reclaimed, giving rise to a single landmass at the end of 18th century. Further land reclamations were done in 20th century that represent the present Mumbai, which was earlier known as Bombay.

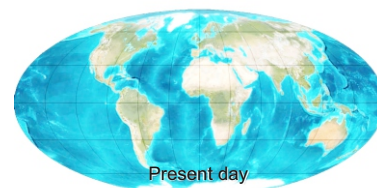
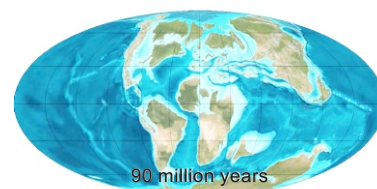
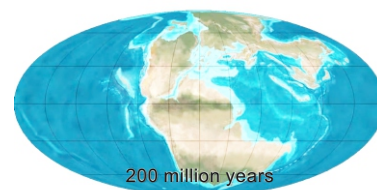
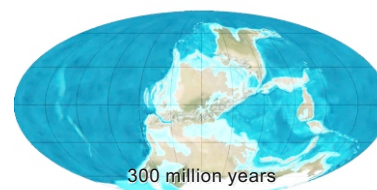
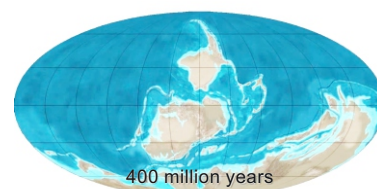
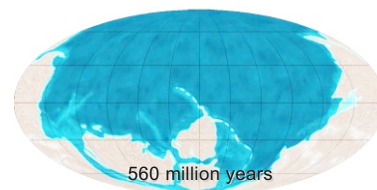


Geology of Mumbai:

- Seven islands with history of reclamation since 1800
- Parent rocks of Mumbai region are volcanic in nature; Basalt, Breccia, Tuff
- Thickness of overburden soil 1.0 m to 14.0 m.
- Predominantly: Marine Clay, boulders, filled-up material
- Ground Water is close to ground level
- Intertrappean Sedimentary Rocks like Shale (indicating long period of quiescence in volcanic activity)

Evolution of Earth:

Earth is 4.5 billion years old, and during that time it's been through a lot of dramatic changes as well as enormous disasters that reshaped the oceans and continents.



Source : <https://www.youtube.com/watch>



Know Your Station - Dadar Metro Station



Shivaji Park



Kohinoor Square



Ramnarain Ruia College



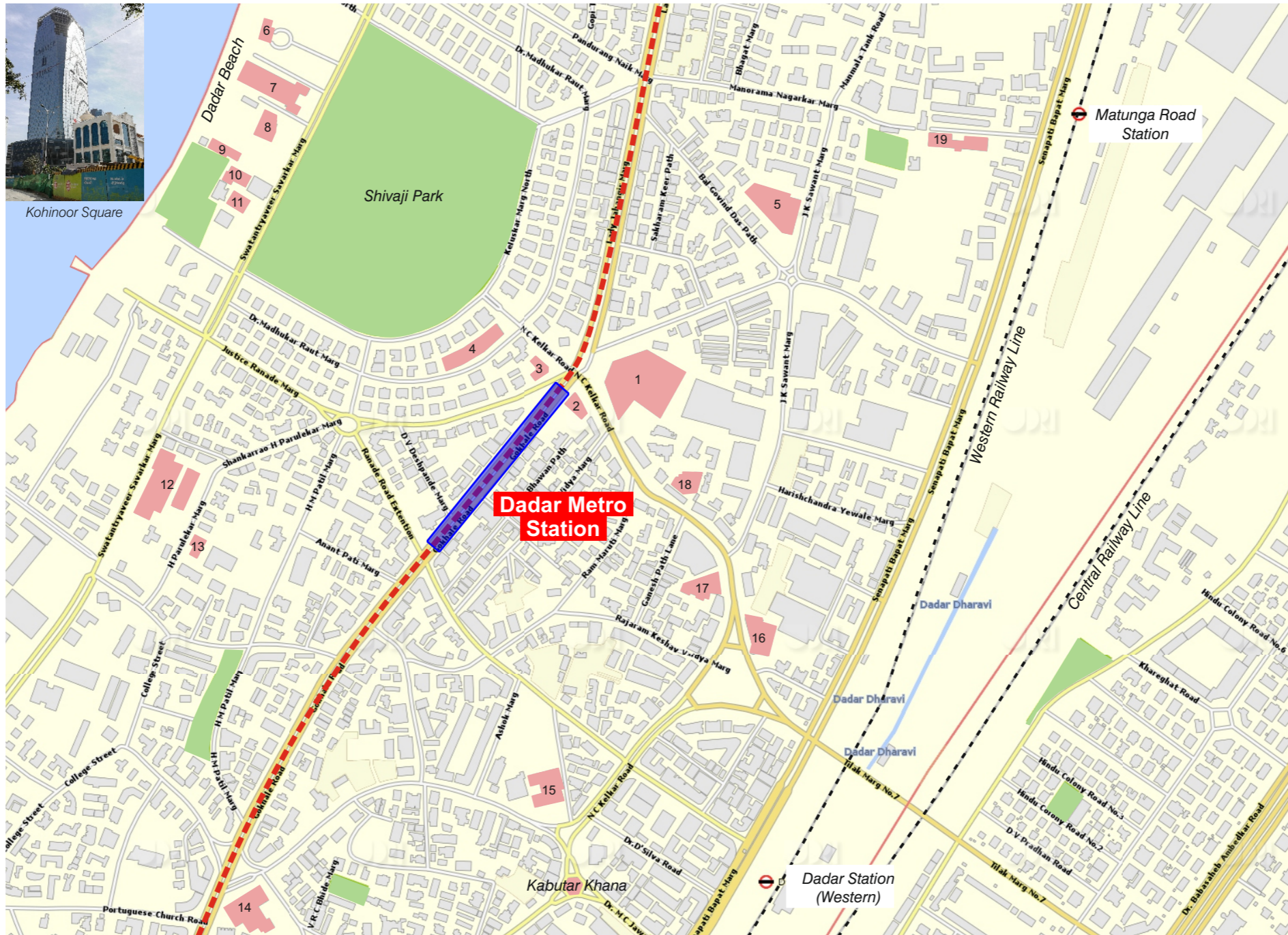
Dadar Beach



Gypsy Restaurant



Plaza Cinema



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



Before Renovation - Plaza Cinema



Cloth Market

- 1. Kohinoor Square
- 2. Shiv Sena Headquarters
- 3. Gypsy Chinese
- 4. Balmohan Vidyamandir
- 5. Yashwant Rao Chavan Auditorium
- 6. Mayor's Bungalow
- 7. Swatantryaveer Savarkar Rashtriya Smarak
- 8. Samyukta Maharashtra Smruti Dalan
- 9. Mahatma Gandhi Memorial
- 10. Vanita Samaj
- 11. Vanita Samaj Sabhagraha
- 12. Institute Of Hotel Management, Catering Technology And Applied Nutrition
- 13. Kohinoor Catering College
- 14. Portuguese Church
- 15. Dr. Antonio Da Silva High School & Jr. College
- 16. Cinema Plaza
- 17. Shivaji Mandir
- 18. Shri Mahaveer Digambar Jain Mandir
- 19. D.G. Ruparel College of Arts, Science & Commerce

Metro-3 is the new dimension on this rich urban heritage fabric of Mumbai and is expected to further enliven the character of this multifaceted precinct of Mumbai.

Dadar Metro is one of the most strategically located station on Metro-3, sits underneath Gokhale Road, spread up between Shiv Sena Bhavan in North and Ranade Road junction in South. Western Dadar is popular especially within middle and upper middle class for shopping and hence the streets around the railway stations are always crowded. The western and central railways confluence at Dadar and Dadar Suburban Station is the most preferred transfer point between Western and Central Railways. The station also caters to intercity service of Central Railway and the areas around station are a 24x7 activity zone. Whole sale vegetable market and flower market near the suburban station begin to be active way before the sun rise and life is at its peak in the evenings. There are several cloth markets, furniture markets, jewelry shops; consumer needs wholesale shops around Dadar Station.

The metro station is located within less than a kilometer distance from suburban railway station and is undoubtedly going to accelerate as well as ease the commute of lakhs of Mumbaikars coming to Dadar every day. Besides the traditional markets, Dadar is also emerging as a center for offices and work centers, which is visible with the brand new skyline marked with the skyscrapers replacing old mills. Some mills around Dadar and Parel that went through transformations in the recent years are Bombay Dyeing (Spring Mills), Kohinoor Mills, Ruby Mills (Dadar West), Bharat Mills, Dawn Mills, Elphinston Mills, Kamala Mills, Jupiter Mills in Parel and Elphinstone area. Most of the redeveloped mill complexes house corporate offices, hotels, business centers, malls etc which has substantially increased the footfall on the suburban stations and areas around the station. The typical scenario in Dadar with the upcoming metro station further imposes a challenge on how effectively, access – dispersal and modal transfer of the commuters is managed.

Dadar, being a link between South Mumbai and Northern suburbs, has been a cultural and educational center specially for Maharashtrians and Marathi speaking population, with presence of Shivaji Mandir, Plaza Cinema, Yashwant Natya Mandir, Swatantryaveer Savarkar Auditorium, many veteran institute like Ruia College and popular urban public spaces like Shivaji Park.

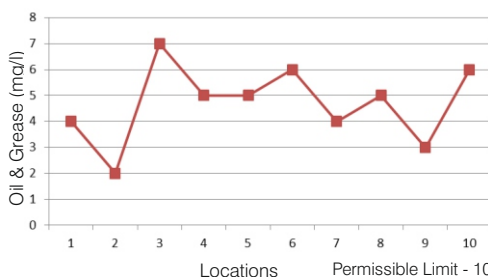
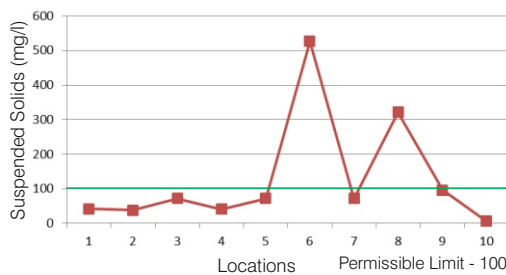
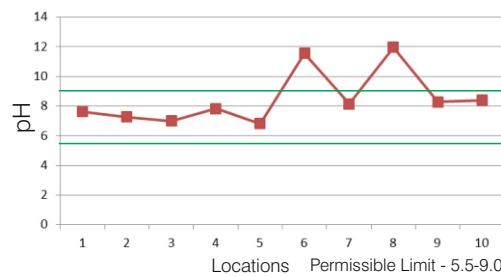
Wastewater Monitoring

Wastewater can be defined as a contamination of water with pollutants which have a potential to cause pollution or alter the physical, chemical or biological properties of the water which may be harmful to public health and other living organisms, if not treated. Wastewater which is also termed as “effluent” is released from various processes and operations performed in industrial, infrastructure, construction projects and other activities. Wastewater monitoring is a part of EIA under environmental monitoring program and a key component to ascertain quality of treated wastewater and assess efficiency of treatment units. It is one of the tools to upgrade the EMP and improve the efficiency of treatment units to ensure quality of treated wastewater to confirm to the regulatory requirements and meet the quality for recycling/reuse as required.

Source of generation of wastewater from Metro-3 project is the generation of underground water contaminated with solid particles during construction of launching shaft and tunneling work at various sites. Wheel washing facilities at stations, launching shaft sites and allied facilities like concrete batching plant, casting yard etc which have become operational at various locations are also the sources of wastewater. Considering the nature of activities of Metro-3 project, major water pollutants of concern are pH, Suspended Solids and oil & grease.

Though, the Metro rail project benefits the commuters and have positive environmental impact, the negative environmental impacts need to be mitigated through implementation of Environment Management Plan and Environmental Monitoring Program. The site Environment Management Plans are prepared by civil contractors and accordingly, wastewater is treated in sedimentation tank provided at stations, launching shaft sites and allied facilities locations. The wastewater quality is monitored regularly on monthly basis by civil contractors through MoEF recognized laboratories. Analysis reports of treated wastewater monitored during November 2017–January 2018 at various locations are confirming to permissible standards laid down in Environment Protection Rules, 1986.

Presently, treated wastewater is being used for dust suppression and for wheel washing to the maximum extent. Possibilities are being explored to recycle tunnel water completely back into cooling operations of tunnelling after ensuring the acceptable quality through adequate treatment.



1. Pali Ground (LS) sedimentation tank UGC 7 (inlet) Nov-17
2. Pali Ground (LS) sedimentation tank UGC 7 (outlet) Nov-17
3. Pali Ground (LS) sedimentation tank UGC 7 (outlet) Dec-17
4. Sedimentation tank outlet (MIDC Station) Dec-17
5. Sedimentation tank outlet (Marol Naka Station) Dec-17
6. Batching Plant UGC 7 (inlet) Dec-17
7. Batching Plant UGC 7 (outlet) Dec-17
8. Batching Plant UGC 4 (inlet) Dec-17
9. Batching Plant UGC 4 (outlet) Dec-17
10. Batching Plant UGC 4 (outlet) Jan-18

Tunnel Update



Package UGC-02: Vaitarna-1 TBM becomes the first TBM to commence its main drive. It will be used to dig a tunnel from launching shaft at Azad Maidan towards Mumbai Central.

Package UGC-03: Tansa-1 TBM being unloaded at Port. Will soon be transported to its launching shaft in Science Museum and to be used for constructing tunnel between Science Museum & Worli.

Package UGC-04: Krishna-2 TBM completed 75 meters tunnelling of initial drive at Naya Nagar launching shaft. Main drive to start soon. Krishna-3 TBM arrived at Mumbai Port. It will be transported soon to the launching shaft at Siddhivinayak station site.

Package UGC-07: Wainganga-1 TBM with 90 meters of tunnelling completes the initial drive at Marol Naka launching shaft. Main drive to start soon. Wainganga-2 TBM arrived at Sariput Nagar ramp launching shaft. It will be lowered soon for its initial drive towards SEEPZ Station. Wainganga-3 TBM arrived at Marol Naka. It will be lowered soon for its initial drive towards CSIA International Airport.

No Free Lunch

Dr. Bal Phondke



Bal Phondke (Dr. Gajanan Phondke) is a leading Marathi writer of science literature (fiction and non-fiction). He worked as a nuclear biologist at the Bhabha Atomic Research Centre from 1962 to 1983. From 1983 to 1989, he was with the Times of India, serving as the Editor of Science Today magazine and also as the science editor of The Times of India broadsheet. He later served as the director of the Publications and Information Directorate of Council of Scientific and Industrial Research, retiring in 1999. After retirement, he served as a guide for various universities and also wrote science articles for several publications.

With increasing urbanisation and ever expanding boundaries of mega-metropolises, fast and comfortable mobility assumes great importance. For a city like Mumbai which is already crumbling under its own weight, quality and quantity of public transportation are highly stressed. This, not only burdens the state with large expenditure directly or indirectly towards meeting expenses on fuel but also poses a threat to environment. Add to this the total discomfort to commuters, often resulting even in loss of life, and the situation becomes critical.

In such a situation, resort to modern means of rapid public transport systems becomes inevitable. All the major thriving cities in the world provide metro systems zigzagging throughout the expanses of the metropolis. London has had the world's first ever underground railway euphemistically called the tube. Paris metro is even better and the Moscow metro, a work of art. But it is time that Mumbai, which aspires to be a leading financial hub, also has its own metro system. The first blue print for such a transport alternative was prepared more than fifty years ago but never saw the light of day for whatever reasons. Still better late than never. Now, these works have been undertaken in right earnest. Citizens have to do their bit by ungrudgingly supporting this endeavour.

It is no doubt a herculean task, what with land in the linear city being scarce. That makes the construction of an over-ground rail network an arduous task. It has to find its way by avoiding and bypassing the existing structures. Additionally, that has to be accomplished without the route becoming user unfriendly.

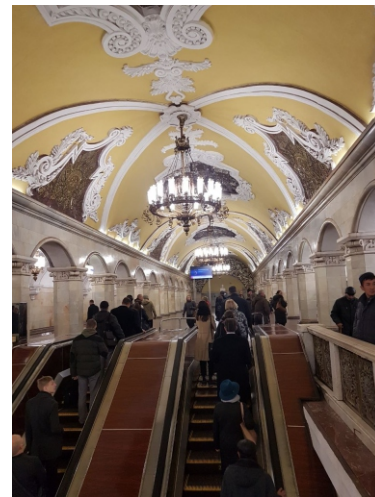
So one can think of going underground. That appears to be a viable proposition on the face of it. However, in a city comprising of a number of islands it is not a cake walk.



Moscow Metro
Pc - Ms. Ashwini Bhide, MD, MMRC

Moreover, almost all the utilities that the vast population has to be provided with have their pipelines already beneath the surface. They have to be left untouched. Traversing the entire length of the city, south to north, is a formidable task. Nonetheless, with the help of modern technology it is possible to overcome the odds.

Even so, that does cause a great deal of inconvenience to motorists as well as pedestrian all along the proposed route. With roads dug up for the construction, the traffic slows down almost to a snail's pace. One could perhaps have avoided that by taking a series processing workstyle where one starts at one end of the route and makes his way sequentially to the other.



Moscow Metro
Pc - Ms. Ashwini Bhide, MD, MMRC

Thus the blockage of roads takes place in but a small section of the city at any one time. And the next section gets dug up only after the first has been restored to its original state. That, as experience elsewhere has amply demonstrated, is time consuming and completion of the entire line takes a long time.

Parallel processing is therefore the choice of many embarking on such an enterprise. In this, the entire length of the propose route can be divided into a number of sections, work on which can begin simultaneously. This no doubt calls for a great degree of skill since the alignment has to be perfect and the ends have to be joined with precision. Nonetheless, the entire project can be completed in significantly shorter time. It is gratifying to see that the Metro-3 has adopted this strategy. That has certainly caused disruption of traffic in an unprecedented manner. But in the long run that would be a small price to pay.

We must remember that there is no free lunch.



News @ MMRC



In the Magnetic Maharashtra Convergence Summit-2018, Metro-3 stall caught attention of several dignitaries, global leaders and visitors including Amabasador of Japan to India Mr. Kenji Hiramatsu, CEO of multinational investment providers, senior bureaucrats, technical experts and citizen of Mumbai.

Shri Datta Padsalgikar, Honorable, CP, Mumbai Police, Ms. Ashwini Bhide along with senior IPS and MMRC officials inaugurated the tunnelling of Vaitarna-2 TBM for package 2. TBM to commence tunnelling from CST to Mumbai Central.



Achieving one more milestone, MMRC awarded two key contracts for Electrical works of 25 kV Traction & Power supply system. L&T was awarded work of Power supply system and Consortium of Alstom Transport India Ltd & Alstom Transport SA was awarded the works of 25 kV Traction system.



MMRC, General Consultants-Maple and Contractors conducted their 3rd workshop on safety, instrumentation and monitoring of buildings along the Metro-3.



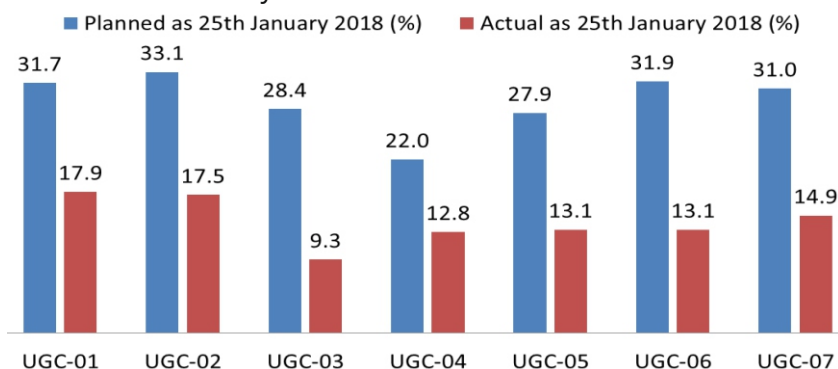
Ms. Ashwini Bhide apprised citizen of Vile Parle on the various aspects of Metro-3 at the programme organised by Prabodhan Manch.



Dr. E. Sreedharan, Principal Adviser of MMRC along with Mr. SK Gupta, Dir (Projects) MMRC & other officials reviewed the civil construction work at Marol Naka. He shared insights on need & importance of Metro for city's development.

Project Progress Update

As on 25th January 2018



Government Polytechnic Institute's professors visited construction sites at Nayanagar, Mahim, Siddhivinayak and Dadar to view the machines and technology used for Metro-3.

MMRC Control Room

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



Website Link

For Private Circulation Only

CONTRIBUTIONS

ARTICLES

A. A. Bhatt
Dr. Makarand Khare
S. Sudheer Kumar
Ajay Fulmali
Rashmi Kadam
Zarqa Khan

EDITING AND GRAPHICS

Pallavi Kulkarni
Zarqa Khan

Connect With Us

@MumbaiMetro3

Mumbai Metro Rail Corporation, MMRC

www.mmrc.com

Mumbai Metro Rail Corporation

NaMTTRI Building, Plot No. R-13
'E'- Block, Bandra Kurla Complex
Bandra (E), Mumbai 400051.