CHENNAI METRO RAIL LIMITED

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POLLUTION PREVENTION AND CONSERVATION OF ECOSYSTEM

This Newslettter highlights the importance of conservation of ecosystem, pollution reduction, and the efforts being made to achieve It, and how each of us can play a role in ensuring that our skies remain blue for generations to come.

Chennai Metro Rail

Welcome to the latest edition of the Environment Newsletter. In this issue, we focus on a critical topic that affects us all.

POLLUTION PREVENTION AND CONSERVATION OF ECOSYSTEM

As a provider of sustainable transport, CMRL is dedicated to reduce the city's pollution levels and enhancing the Chennai's ecosystem.

Together, let's explore the importance of conservation of ecosystem, pollution reduction, and the efforts being made to achieve it, and how each of us can play a role in ensuring that our skies remain blue for generations to come.

PREFACE

In an era of rapid urbanization and infrastructure development, the need for sustainable solutions has never been greater. This edition of our magazine explores innovative strategies that blend ecological balance with modern construction practices. We delve into sustainable noise barriers, which not only reduce sound pollution but also contribute to green infrastructure.

Additionally, we highlight the role of compensatory plantations in enhancing the ecosystem. A remarkable sight of the nesting and brooding of Indian Blue Robin within a compensatory plantation site underscores the success of afforestation efforts in providing safe habitats for birds and other wildlives. We also discuss pollution prevention and control strategies, addressing air, water, and soil conservation techniques that align with sustainable development goals.

Through these insights, we aim to inspire responsible urban planning and environmental stewardship, ensuring a greener and more harmonious coexistence between nature and human progress.

Finally, we extend our heartfelt gratitude to the Managing Director and Director (Projects) of CMRL for their unwavering support and vision in promoting innovation and sustainable practices. Their leadership has been instrumental in fostering ecological conservation alongside urban development.

Dr. Rajeev K Srivastava
Chief Advisor Environment

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Mangroves
The guardians of Chennai

Saravana Kumar R | Manager Environment | CMRL

Mangrove forests, unique intertidal ecosystems along coastal regions, play a crucial role in maintaining ecological balance. Chennai, with its extensive coastline, hosts significant mangrove forests in Pulicat Lake, and the Ennore and Adyar estuaries. These mangroves act as buffers against coastal erosion, storm surges, and rising sea levels while supporting biodiversity.

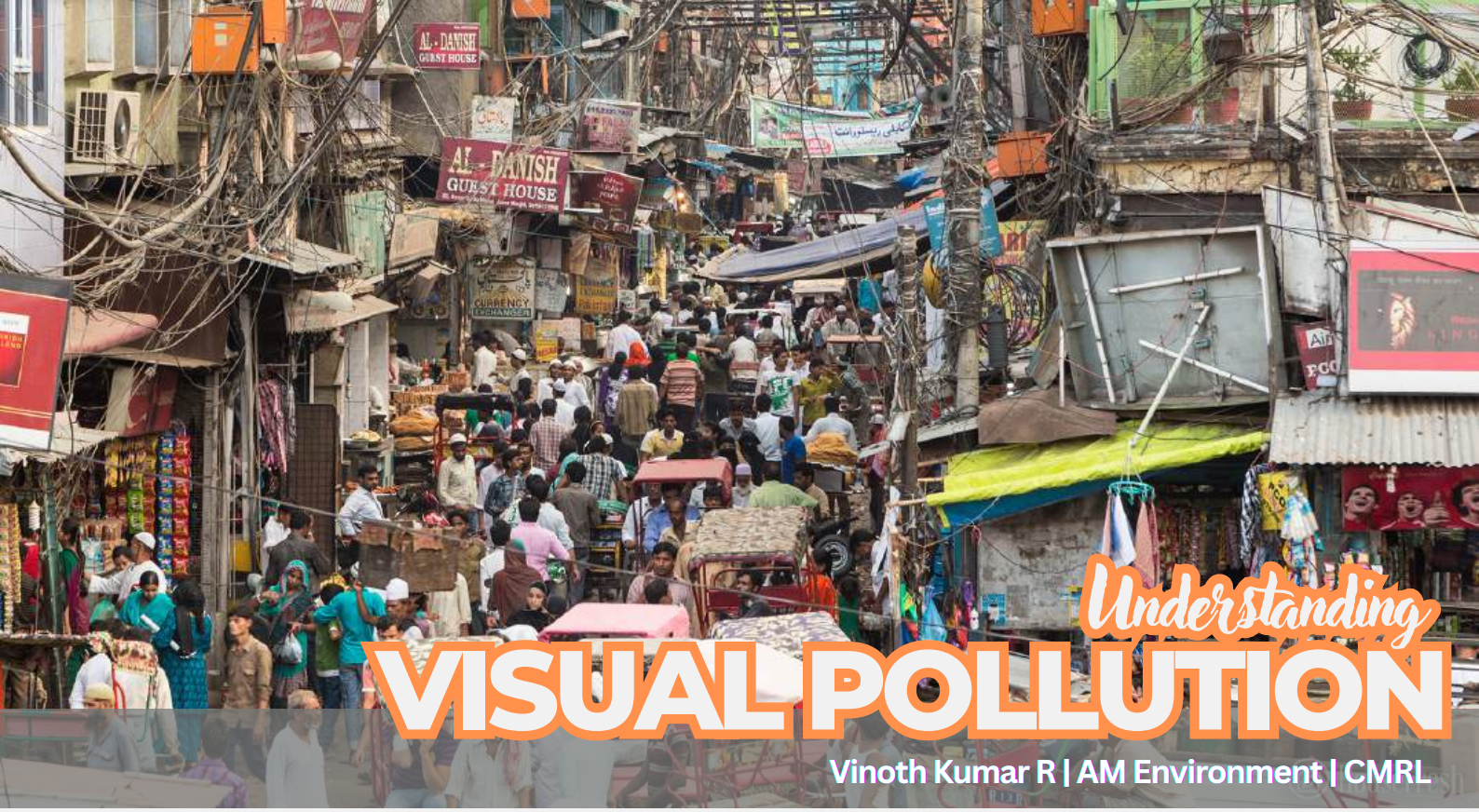
Mangrove Ecosystems in Chennai
Pulicat Lake, one of India's largest brackish water lagoons, shelters diverse mangrove species vital for migratory birds and marine life. The Ennore Creek and Adyar Estuary, despite urbanization pressures, remain crucial nurseries for aquatic species. Over the last decade, thanks to the conservation efforts of chennaites, the mangrove forest area has increased by 12%.

Environmental Significance
Mangroves efficiently sequester carbon, mitigating climate change. Their dense root systems stabilize coastlines, preventing soil erosion. As natural barriers, they shield against cyclones and tsunamis—critical for Chennai, prone to such disasters.

Additionally, mangroves support a diverse range of wildlife, including fish, crabs, mollusks, and birds, forming an indispensable part of the coastal food chain. They also sustain local livelihoods, especially those dependent on fishing and ecotourism.

Threats and Conservation Efforts
Despite their ecological importance, mangroves in and around Chennai face severe threats from rapid urbanization, industrial pollution, and encroachments. Waste disposal and land reclamation for infrastructure projects have led to a decline in mangrove cover. Conservation efforts, including afforestation projects and government initiatives, are being undertaken to protect and restore these vital ecosystems.

Conclusion
Mangrove forests are Chennai's natural shield against climate-related hazards and are integral to coastal biodiversity. Sustainable conservation strategies, community participation, and stricter environmental regulations are necessary to ensure their survival. Protecting these forests will not only safeguard the city's environment but also enhance its resilience against future climatic challenges.



Understanding VISUAL POLLUTION

Vinoth Kumar R | AM Environment | CMRL

Visual pollution is an often-overlooked issue that affects urban aesthetics and quality of life. From towering billboards and excessive neon signs to unregulated urban sprawl and litter, it disrupts the harmony of an environment. Unchecked urbanization, excessive advertisements, overhead wires, poorly planned infrastructure, graffiti, and waste all contribute to this growing problem.

Cluttered environments can cause psychological stress, anxiety, and mental fatigue. Studies indicate that exposure to visually chaotic surroundings can increase stress levels by up to 20%. High levels of visual pollution lead to decreased property values, with some reports suggesting a decline of up to 15% in affected areas. Additionally, tourist destinations impacted by excessive visual clutter see a drop in visitor numbers, sometimes by as much as 25%. Overwhelming advertisements and chaotic urban layouts can distract drivers, with research linking visual distractions to a 12% increase in road accidents. Uncontrolled development also results in environmental degradation, harming natural landscapes and green spaces.

Addressing visual pollution requires collaboration between governments, urban planners, businesses, and individuals. Stricter advertising regulations can limit billboards and neon signs, reducing clutter and improving urban aesthetics. Underground wiring systems help by relocating cables, creating cleaner cityscapes. Well-planned zoning and urban development foster organized and visually appealing spaces. Public awareness campaigns educate communities about the impact of visual pollution, encouraging responsible civic participation. Sustainable architectural design promotes eco-friendly and aesthetically pleasing structures. Green spaces and beautification projects, such as tree planting and park maintenance, help counteract visual clutter. Government policies enforcing zoning laws and penalties for non-compliance are essential in minimizing visual pollution.

Visual pollution significantly impacts urban life. By implementing effective solutions, communities can create cleaner, more aesthetically pleasing environments that promote well-being and sustainability. The responsibility lies with policymakers, businesses, and individuals to ensure that development maintains visual harmony.

SUSTAINABLE NOISE BARRIERS

Saravanan P | AM Environment | CMRL

With urbanization and expanding transportation networks, noise pollution has become a major environmental concern, affecting public health. Noise barriers are a common solution, and recent research focuses on incorporating waste and plant-based materials to enhance sustainability while maintaining acoustic efficiency.

The Need for Sustainable Noise Barriers

Traditional noise barriers, made from concrete, metal, and synthetic materials, have high environmental costs due to energy-intensive production and disposal challenges. Integrating sustainable materials such as construction waste, plant fibers, and recycled rubber aligns with circular economy principles, reducing environmental impact.

Acoustic Performance of Waste-Based Materials

Studies show that construction and demolition waste, porous concrete, combustion ash, and tire waste are effective in noise barrier construction. Concrete mixed with demolition waste enhances sound absorption due to increased porosity. Similarly, panels made from coal bottom ash and Portland cement offer excellent low-frequency sound absorption, making them suitable for highways. Recycled rubber granules improve both acoustic and thermal properties when incorporated into concrete.

Plant-Based Materials for Noise Reduction

Organic materials like coconut fiber, straw, palm tree pruning waste, hemp fiber, and bamboo have been studied for their sound absorption capabilities. Coconut fiber barriers can reduce noise by 15–20 dB in the 3000–15,000 Hz range, while hempcrete barriers achieve reductions of up to 46 dB, highlighting their eco-friendly effectiveness. Natural vegetation barriers, such as bamboo and dense shrubs, provide noise reduction of 4–30 dB, depending on species and density.

Ongoing research explores innovative and sustainable materials for noise barriers. Combining waste-based and plant-based materials offers a promising direction for improving acoustic performance while promoting environmental sustainability. Further studies on durability, weather resistance, and large-scale implementation will be crucial for their adoption.

In conclusion, integrating recycled and plant-based materials into noise barrier construction is a sustainable solution to noise pollution. These materials not only enhance acoustic performance but also support waste reduction and eco-friendly urban planning.

AIR POLLUTION CONTROL
IN URBAN INFRASTRUCTURE PROJECTS

The rapid pace of urbanization presents a dual challenge: fostering economic growth while minimizing environmental impacts. Pollution—encompassing air, water, noise, and waste—poses a significant threat to urban ecosystems. Infrastructure projects like Chennai Metro Phase 2 provide an opportunity to implement advanced pollution prevention and control measures, setting a benchmark for sustainable development.
This article examines how the Chennai Metro Phase 2 project integrates state-of-the-art techniques to mitigate pollution across its various corridors.

Air Pollution Control Measures

1. Dust Hotspots
- Along the metro corridor, the areas that are prone to frequent dust emission are identified. CMRL focuses on these dust hotspots with mitigation measures doctored to its existing site and operational conditions. These Dust Hotspots are monitored and revised continuously with respect to the schedule of works.

2. Dust Mitigation
- High-frequency water sprinkling systems reduce dust emissions from excavation and material transport.
- Anti-smog guns are used during peak construction periods to disperse airborne particulates.

3. Emission Control
- The use of Bharat Stage VI (BS-VI) compliant vehicles and machinery minimizes harmful emissions.
- On-site power generators equipped with pollution control devices ensure cleaner energy production.

4. Vegetative Barriers
- Planting trees and shrubs near work sites acts as a natural filter for dust and particulate matter.

5. Monitoring
- Real-time and regular air quality monitoring stations are installed to ensure compliance with permissible limits as per norms.

As India continues its urbanization journey, the Chennai Metro project serves as a model for balancing progress with environmental responsibility. Through its commitment to long-term sustainability, it inspires other urban infrastructure initiatives to follow suit, contributing to cleaner, healthier, and more resilient urban environments.

Jayaprasand
Natural Environmental Specialist
NKAB

Decarbonization of Construction Industry

Sivaraman P
Environmental Monitoring Specialist
NKAB

The construction sector is responsible for 37% of global CO_2 emissions, with 16% attributed to embodied carbon—emissions from material sourcing, manufacturing, logistics, and construction activities. As one of the largest contributors to global warming, the industry must prioritize decarbonization. India, committed to achieving net-zero emissions by 2070, must address both operational and embodied carbon in its construction practices to meet its climate goals.

Key Strategies for Decarbonization

1. Sustainable Design
- Use low-carbon materials like recycled steel, fly ash concrete, and GGBS.
- Source materials locally to reduce transportation emissions.
- Reuse materials and minimize demolition waste.

2. Policy Support and Standards
- Strengthen green building standards and regulations to address embodied carbon.
- Promote ecosystem-wide adoption of sustainable practices.

3. Operational Emissions Reduction
- Incorporate renewable energy and energy-efficient systems in building designs.

4. Improved Waste Management
- Implement robust recycling plans for construction and demolition waste.
- Use on-site waste segregation and circular economy principles to reduce landfill dependency.

5. Enhanced Construction Techniques
- Adopt modular and prefabricated methods to improve efficiency and minimize waste.
- Utilize energy-efficient machinery and optimize logistics to lower transportation emissions.

6. Monitoring and Reporting
- Conduct regular carbon footprint assessments using Life Cycle Assessment (LCA) tools.
- Ensure transparency in emissions reporting and set measurable sustainability targets.

Conclusion

India's construction industry can lead global sustainability efforts by reducing embodied and operational carbon. Embracing green certifications, digital tools, and innovative techniques will accelerate the transition to a low-carbon future while setting a benchmark for global best practices.

Renewable Energy in Construction

A Sustainable Future

Renewable energy, derived from natural sources like the sun, wind, and water, offers a sustainable and eco-friendly solution to the construction sector's significant energy demands. With decreasing costs and a lower environmental impact, renewable energy is transforming construction practices worldwide.

Solar Applications in Construction

1. **ff-Grid Power Systems:** Solar power provides a reliable and cost-effective alternative to diesel generators, offering consistent electricity for remote sites with minimal maintenance.
2. **Tool Generators:** Solar mobile power units supply energy to power tools and act as backup sources. These generators are eco-friendly, cost-efficient, and effective for industrial operations.
3. **Lighting:** Solar LED lights ensure construction can continue safely after dark, reducing electricity costs and reliance on batteries.
4. **Ventilation:** Solar-powered ventilation systems remove pollutants and stale air, improving air quality and energy efficiency.
5. **Translucent Roofing:** Designed to reduce UV exposure and improve daylight usage, these innovative materials enhance energy savings and durability.

Benefits of Renewable Energy in Construction

Switching to renewable energy sources significantly reduces carbon emissions, lowers operational costs, and promotes environmental responsibility. Solar-powered solutions, in particular, offer low maintenance, energy independence, and long-term savings.

Conclusion

The construction industry plays a pivotal role in combating climate change by adopting renewable energy. Integrating technologies like solar power not only minimizes the sector's carbon footprint but also ensures economic and environmental sustainability. By embracing these practices, the construction sector can lead the way toward a cleaner, greener future.

Selvendiran K
Sr. Env. Manager
NKAB

Restoring Ecosystems Through Compensatory Plantation

A Case Study of Indian Blue Robin

The preservation of biodiversity and the establishment of robust ecosystems remain integral commitments of CMRL. Acknowledging the adverse effects of urban expansion on natural habitats, CMRL has implemented compensatory afforestation projects to mitigate environmental degradation. This initiative prioritizes the re-establishment of green cover and ecological equilibrium, ensuring the sustenance of various wildlife species.

As part of the Phase II Extension, CMRL, in collaboration with M/S ITD Cementation India Ltd, introduced native plant species in two Thiruvallur locations: 2,220 saplings at Meenakshi College and 1,240 saplings at Ambedkar Law College. Situated approximately 60 km from Chennai, these sites were meticulously chosen to promote biodiversity. Among the introduced species, the shrub Lawsonia inermis (henna) was selected for its ecological significance. As a dense, evergreen tree, it provides a critical habitat for small avian species, contributing to ecological restoration.

A site assessment conducted on November 23, 2024, by CMRL representatives revealed a notable ecological development: the Indian Blue Robin was observed nesting within the plantation. The bird, incubating three light blue eggs, had constructed a large cup-shaped nest amidst the dense branches of a henna tree. Breeding primarily in the Himalayas from May to July, this species embarks on its migration toward Southern India in August, wintering predominantly in hill forests. The presence of this species within the plantation underscores the success of CMRL's afforestation initiatives in fostering suitable habitats for migratory birds.

CMRL's compensatory plantation initiative has demonstrably contributed to ecological restoration, as evidenced by the return of migratory species such as the Indian Blue Robin. This project exemplifies an effective synergy between urban development and biodiversity conservation, reinforcing the importance of strategic afforestation in counteracting habitat loss. Future efforts should concentrate on expanding green spaces and systematically monitoring wildlife presence to fortify urban ecological balance.

Ram Singh
Environment Expert
AEON

CMRL Bags GEEF Award 2024

Chennai Metro Rail Limited Bagged the GEEF's Global Sustainability Award (GOLD) for its exceptional energy conservation and sustainability. [In pic] M A Siddique (MD), Archunan T (DP) and Rajeev K Srivastava (CAE) celebrated the moment of achievement with the GEEF Award.

With immense pride, I congratulate our incredible team for their dedication and invaluable efforts, which have led us to this prestigious GEEF award. This achievement is a testament to our collective passion and environmental commitment. Let us all continue striving for greater success and setting new benchmarks.

Siddique M A
Managing Director, CMRL

Dr. Rajeev K Srivastava, Chief Advisor Environment and Saravana Kumar R, Manager Environment received the award on behalf of CMRL, at the Global Sustainable Development Summit held in JW Marriott Aerocity, New Delhi on 8th November 2024.

Recognition from Print and Media

சுற்றுச்சூழல் பாதுகாப்புக்கு பங்களிப்பு மெட்ரோ ரயில் நிறுவனத்துக்கு சர்வதேச விருது

சென்னை

சர்வதேச எரிசக்தி மற்றும் சுற்றுச்சூழல் அமைப்பு சார்பில் டெல்லியில் கடந்த 8-ம் தேதி உச்சி மாநாடு நடைபெற்றது. இதில், புதுப்பிக்கத்தக்க எரிசக்தி மற்றும் சுற்றுச் சூழல் பாதுகாப்பில் சிறப்பான பங்களிப்பை அளிக்கும் சென்னை மெட்ரோ ரயில் நிறுவனத்துக்கு சர்வதேச தங்க விருது வழங்கப்பட்டது.

சென்னை மெட்ரோ ரயில் நிறுவனத்தின் நிர்வாக இயக்குநர் சித்திக்கிடம், சுற்றுச்சூழல் பிரிவு தலைமை ஆலோசகர் ராஜீவ் கே.ஸ்ரீவஸ்தவா தங்க விருதை காண்பித்து வாழ்த்து பெற்றார். சென்னை மெட்ரோ ரயில் நிறுவன திட்ட இயக்குநர் தி.அர்ச்சுனன், கூடுதல் பொது மேலாளர் ஹரி பிரசாத் உடன் இருந்தனர்.

சென்னை மெட்ரோ ரயில் நிறுவனத்திற்கு விருது

சென்னை, நவ. 20-

புது தில்லியில் நடைபெற்ற, உலகளாவிய ஆற்றல் மற்றும் சுற்றுச் சூழல் அறக்கட்டளை ஏற்பாடு செய்த உச்சி மாநாட்டில் சென்னை மெட்ரோ ரயில் நிறுவனம் மதிப்புமிக்க உலகளாவிய நிலைத்தன்மை விருதினை வென்றுள்ளது.

சென்னை மெட்ரோ ரயில் நிறுவனத்தின் சுற்றுச் சூழல் தலைமை ஆலோசகர் டாக்டர் ராஜீவ் கே.ஸ்ரீவஸ்தவா இந்த விருதை சென்னை மெட்ரோ ரயில் நிறுவனத்தின் மேலாண்மை இயக்குநர் எம்.ஏ.சித்திக்கிடம் வழங்கி வாழ்த்து பெற்றார். 'சென்னை மெட்ரோ ரயில் நிறுவனம் காற்றின் தரத்தை மேம்படுத்துதல், சுற்றுச்சூழல் வளங்களை பாதுகாத்தல், சூரிய சக்தியை அதிக அளவில் பயன்படுத்துதல் மற்றும் பசுமை இல்லா வாயு உமிழ்வைக்குறைத்ததற்காக இந்த விருது வழங்கப்பட்டுள்ளது.

Global Sustainability Award for Chennai metro rail

Chennai: The Chennai Metro Rail Limited (CMRL) has been honoured with the Global Sustainability Award 2024 by the Global Energy and Environment Foundation (GEEF). The award was presented during the Global Sustainable Development Summit 2024 held recently in New Delhi. This is in recognition of the metro rail's contributions to the United Nations' Sustainable Development Goals (SDGs), particularly through innovative and eco-friendly initiatives, a release stated. ENS

சென்னை மெட்ரோ ரயில் நிறுவனத்துக்கு தங்க விருது

சென்னை, நவ. 20: சென்னை மெட்ரோ ரயில் நிறுவனம் சுற்றுச்சூழல் பாதுகாப்புக்காக, உலகளாவிய நிலைத்தன்மை விருதுகள் 2024-இல் தங்கம் வென்றுள்ளது.

சென்னை மெட்ரோ ரயில் நிறுவனம் சென்னையில் கட்டுமானப் பணிகள் நடைபெற்றுவரும் இடங்களில் காற்றின் தரத்தை மேம்படுத்துதல், சுற்றுச்சூழல் வளங்களைப் பாதுகாத்தல் உள்ளிட்ட பல்வேறு சுற்றுச்சூழல் பாதுகாப்புக்கான நடவடிக்கைகளை மேற்கொண்டு வருகிறது.

இதனை அங்கிகரிக்கும் வகையில், உலகளாவிய ஆற்றல் மற்றும் சுற்றுச்சூழல் அறக்கட்டளை சார்பில் தில்லியில் கடந்த 8-ஆம் தேதி நடைபெற்ற உச்சி மாநாட்டில், சென்னை மெட்ரோ ரயில் நிறுவனத்துக்கு மதிப்புமிக்க உலகளாவிய நிலைத்தன்மை விருது 2024-இல் தங்கம் வழங்கியது.

தில்லியில் நடைபெற்ற இந்நிகழ்ச்சியில் கலந்து கொண்டு விருதைப் பெற்ற சென்னை மெட்ரோ ரயில் நிறுவனத்தின் சுற்றுச்சூழல் தலைமை ஆலோசகர் ராஜீவ் கே.ஸ்ரீவஸ்தவா, சென்னை மெட்ரோ தலைமை அலுவலகத்தில் நிறுவனத்தின் மேலாண்மை இயக்குநர் எம்.ஏ.சித்திக்கிடம் விருதை புதன்கிழமை காண்பித்து வாழ்த்து பெற்றார்.

இந்நிகழ்வில், சென்னை மெட்ரோ ரயில் நிறுவன திட்ட இயக்குநர் தி.அர்ச்சுனன், கூடுதல் பொது மேலாளர் ஹரிபிரசாத் (இயந்திர அமைப்பு), சரவணகுமார், மேலாளர் (சுற்றுச்சூழல்) உள்ளிட்டோர் உடன் இருந்தனர்.

For feedback, queries, and submission of articles for the next edition of the Newsletter, Kindly contact Dr. Rajeev K Srivastava, Chief Advisor (Environment), or send an email to srivastava.rajeev@cmrl.in / saravanakumar.r@cmrl.in / vinothkumar.raju@cmrl.in.

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