

the rail enthusiast

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The Rail Enthusiasts' Society Quarterly



MASS TRANSPORTATION

Delhi Metro: Instrument of Change

MUSEUMS

EAST JAPAN RAILWAY MUSEUM

PHOTO FEATURE!

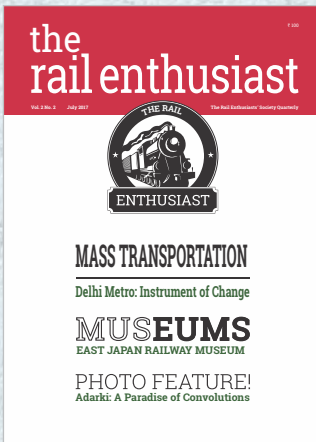
Adarki: A Paradise of Convolutions



The Indian Railways know the American Locomotive Company

(ALCO) well: from the late 1950s to the end of the last century, diesel-electric locomotives built to ALCO designs were the railway's workhorses. What is not so well known is the fact that starting 1901, ALCO was primarily a steam locomotive builder till the outbreak of the Second World War, after which it switched to diesels. During the steam era, it also built snow ploughs that were used to clear track of snow. One of these ploughs, No. 10, can be seen at the North-West Rail Museum at Snoqualmie, near Seattle, in the USA. Built at the company's Cooke Works in 1907, it worked till 1964. A rotary plough measuring 9 foot 8 inch in the front was driven by steam through a 2-cylinder steam engine. Originally, it was designed to run on coal but was converted to oil in 1947. It was not self-propelled and needed a locomotive, steam or diesel, to push it.





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for the Rail Enthusiast

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Musings of the Editor...

Although local suburban trains have been running for quite some time in Mumbai, Chennai, Kolkata and Delhi, it was only in 1984 that the country saw its first real metro, or rail-based mass underground rapid transit system. This was when the metro line in Kolkata was opened. It took another 18 years before the second metro came up, this time in the capital, New Delhi. The success of the latter was phenomenal: ridership is now of the order of 3 million per day and increasing. Apart from providing a world-class mass transportation service, Delhi Metro had a far wider impact on and acted as an instrument of change for virtually all aspects of Delhi's society. It acted as a catalyst for the building of metro rail systems across the length and breadth of the nation. In this issue, we bring you an article by Anuj Dayal on the impact of the metro in Delhi. We are quite sure that metros in other cities would have had similar effects and significance.



The Airport Express line of Delhi Metro

While the Delhi Metro has been a runaway success, the Delhi Ring Railway is a very poor cousin. Although much older and theoretically carrying passengers, it is little known and little used by the city population. All the same, we bring you a short, absorbing and captivating account of a ride on the Delhi Ring Railway by Warren Miller, an Australian rail enthusiast. Just shows that even the most mundane and not-so-well-known aspects of the railways can be of interest to an enthusiast. We sum up the theme of Mass Transportation by bringing you a brief account of the Moscow Metro by Sudhir Kala that brings out the grandeur and splendour of the construction of one of the largest metro networks worldwide.

Rail photographers love to photograph trains. One such photography buff, Apurva Bahadur, has made the photographing of trains against picturesque backgrounds his hobby. We bring you some of his breathtaking pictures in the Photo-feature: Adarki – a Paradise of Convolutions. This is a little known station on the Pune-Miraj line but offers an excellent canvas for photographers to indulge in their hobby and produce stunning pictures. Another example of an obscure item, like the virtually unknown Adarki station, being the easel on which the rail aficionado paints his passion.



Traversing 'Kati Pahadi' near Adarki

For the steam buffs, we talk of the geared locomotives that had become popular among the logging companies in North America. These locomotives were designed for pulling heavy loads up steep gradients and over sharp curves on hastily laid temporary track. Although not seen in India, a model of a geared locomotive, a 'Shay', is on display at NeverEnuf Garden, a model railway not far from New Delhi. While on the subject of rail modelling, Kaustav Chatterjee writes of the model he has created of a port railway. Modellers create their models based on an actual prototype or they can produce purely imaginary systems. Kaustav's model falls in the latter category.



The turn-table inside the East Japan Railway Museum



The Moscow Metro

In all our issues till now, we have attempted to cover a variety of subjects so that there is something for each and every rail enthusiast, however diverse his or her interest. At the same time, one group we do not intend to forget or lose sight of is the young budding enthusiast. As a consequence, we have departed from our normal practice of interviewing an eminent rail enthusiast and have this time interviewed our youngest member – a person well on the way to becoming an enthusiast.

We also continue our series, "The Train". This series is designed to tell the budding enthusiast on what it takes to run a train. In the last issue we had talked of rail track; we now introduce him to bridges and viaducts, an essential part of any rail line, to cross rivers and handle deep valleys.

We have not reduced our international coverage by taking you to the demilitarised zone between the two Koreas and to the East Japan Railway Museum at Omiya, on the outskirts of Tokyo in Japan. We have also covered the geared steam locomotives that were common in North America.

Although we now have three issues in circulation, we have received very little written feedback. We do keep getting a large number of comments and suggestions, but they are primarily verbal. It will help us a lot to produce a magazine that caters to your tastes and liking if we get written feedback that can be kept as a permanent record for reminding us of what our readers think of the fare that we have been offering.

Happy reading and happier rail-fanning,

(J.L. Singh)
Editor

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Mass Transportation

Riding the Ring Railway in Delhi

Neglected, forgotten and side-lined, few travel by the Delhi Ring Railway. But **Warren Miller**, an Australian rail enthusiast, did and writes delightfully of his circuit of the ring

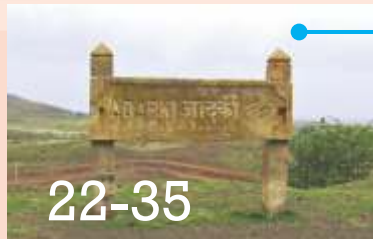


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Mass Transportation

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Deepak Sapra loves to travel; fortunately for him, his job allows him to indulge in this. He shares his experiences of the little known train line through the demilitarised zone between the two Koreas

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Wrightsville Port: An American Layout, Made in India

While many rail modellers base their models on real prototypes, **Kaustav Chatterjee** based his on an imaginary port in the USA. Read about this model port railway in the USA but made very much in India

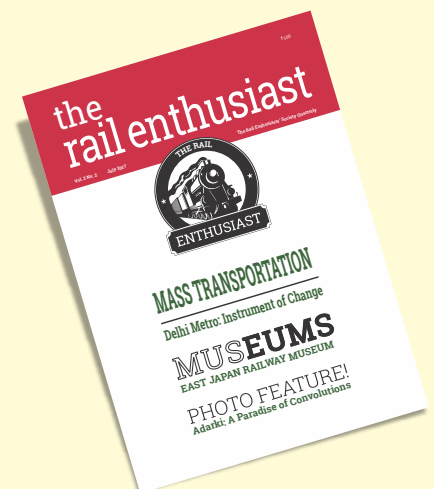
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Arjun Balakrishnan

In a complete departure from our previous interviews, the **Rail Enthusiasts' Society** interviewed its youngest member, **Arjun Balakrishnan**, in its declared objective of addressing and encouraging budding enthusiasts



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In this issue, we tell our budding enthusiasts of the bridges and viaducts that are required to cross rivers and negotiate deep valleys



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Feedback

Dear Editor,

I am a relatively new entrant to **The Rail Enthusiasts' Society** and was thrilled to get a copy of the slickly produced first quarterly publication entitled **The Rail Enthusiast**. While almost everything between the covers fascinated me, the part that thrilled me most related to the keynote address by Alexander Karnes, rendered uniquely, published in its entirety in the journal. I would have been delighted to meet Mr. Karnes and benefit from his infectious love of the steam locomotive and stationary steam motors too.

My concluding years of railway service (1992-1995) with Indian Railways were spent with the South Eastern Railway (Bengal-Nagpur Railway, BNR, of yester years). Then, there were only some miniscule steam locomotive services remaining, but, more importantly, the BNR steam locomotive depots were still very much intact with a wide variety of technologies that had been employed to manage its steam locomotive fleet. One that fascinated me most related to a Steam Motor Line Shaft Driver. These drivers were widely prevalent in the steam era to operate machine tools in the machine shops of wayside steam locomotive depots. It would appear that the emphasis was entirely on self-sufficiency in relation to steam locomotive upkeep: even to drive the machine tools in the depots, the then maintenance managers did not wish to be dependent on an electric motor to drive the line shaft but preferred a steam motor. Possibly, electric power supply situation in many parts of the territory served by BNR was not entirely dependable, reinforcing the conviction of the maintenance managers of the time to opt for the steam motor.

I am attaching two photographs of the steam motor in Bankura steam locomotive depot that was made fully operational in 1995. Not only did the steam motor operate by itself, it was also connected to the line shaft and used for metal removal to demonstrate the efficacy of the system. The entire exercise was fascinating with a furiously spinning ball governor meant to shut off steam when over speeding is sensed, but not being very effective at this point of time!

What is seen in the photographs is a fully self-contained assembly, complete with its own boiler. I learnt later that this entire assembly was possibly donated to a Science Museum in Kolkata. Possibly the

right place for this equipment, if at all it can be retrieved, would be the Rewari Steam Shed, which is likely to be able to sustain steam era locomotive technologies for the decades to come.

This system of steam motors driving overhead line shafts was widely prevalent with textile mills, apart from being used in



Steam engine line shaft driver

locomotive depots

By and large, even by the 1960s, the concept of a battery of machine tools being driven by a line shaft driver had been given up with each machine being driven with its own captive motor, almost always electric. In this milieu, it would be hard to imagine for manufacturing engineers of today to visualise that one large motor powered a whole lot of machine tools from a height, through a system of fixed

Dear Editor,

Reading the article "Jubilee Bridge History Reinstalled" by Sanjoy Mookerjee in your latest April 2017 issue leads me to extract the following from the book, "Our Viceregal Life In India - Selections From My Journal - 1884-1888 Volume 2" by the Marchioness of Dufferin and Ava: "21st February, 1887 - Calcutta "...We had to breakfast earlier than usual, and to start off in the launch to some strange port on the river, where we disembarked on red cloth and stepped into our very own railway carriage which, in some mysterious way, had arrived from the centre of India to receive us and take us a few miles up the Hooghly, where we were to open a grand new 'Jubilee Bridge'. At Hooghly all the highest officials met us and we got on a truck dais and were pulled into the sheds; then Sir Rivers Thompson in a speech invited the Viceroy to declare the bridge open. D. (Dufferin) did this in a few words and then with a blazing sun shining on our small bonnets, we descended a great flight of stairs and made our way to an immense floating machine, on which breakfast was laid for 300 people. It was a



Driven overhead line shaft

and loose pulleys and flat belts! Even more difficult to visualise would be that there was a time when a steam motor was used for this purpose. It was indeed a privilege to be able to glimpse the revived steam shaft driver that had been working possibly till the 1950s.

Yours sincerely,

V Narayanan

15.05.2017

ball supper at 10 a.m.; but happily tea and dry toast were to be had, as well as champagne, mayonnaises and ices. Sir Bradford Leslie, the engineer of the bridge, took me down and we sat and ate and looked at his work, which was just above us; and when the meal was over D. proposed his health and we applauded and rattled our knives on the table, and 'received' the toast with great enthusiasm. Sir Bradford replied and we remounted the stairs and got into our carriage and crossed the Hooghly in the first passenger train that has gone over the Jubilee Bridge..."

Since the Bridge was inaugurated by Lord Dufferin as per the journal on 21st February, the traffic could not have been opened on it on 16th February as the article mentions! Actually, Lady Dufferin specifically writes that her train – the first passenger train – went over this bridge after the opening.

Regards,

Yours sincerely,

BMS Bisht

15.07.2017

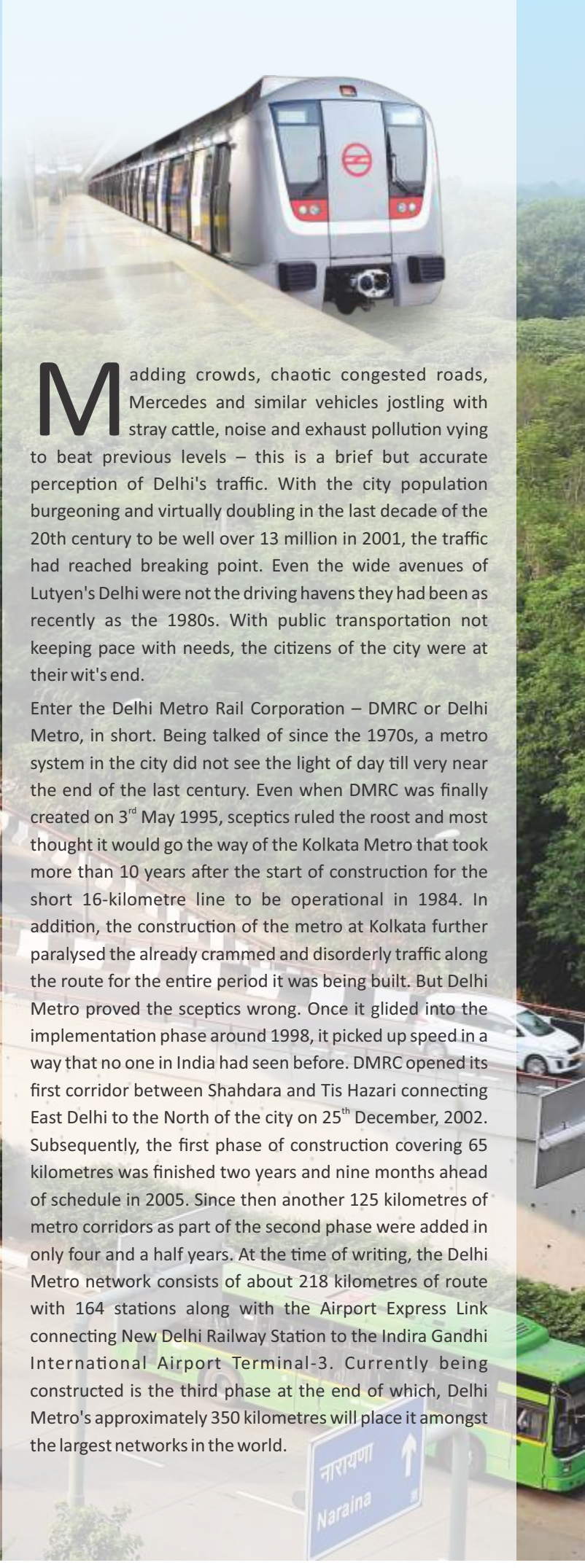
Mass Transportation

Delhi METRO

Instrument of Change

Anuj Dayal





Madding crowds, chaotic congested roads, Mercedes and similar vehicles jostling with stray cattle, noise and exhaust pollution vying to beat previous levels – this is a brief but accurate perception of Delhi's traffic. With the city population burgeoning and virtually doubling in the last decade of the 20th century to be well over 13 million in 2001, the traffic had reached breaking point. Even the wide avenues of Lutyen's Delhi were not the driving havens they had been as recently as the 1980s. With public transportation not keeping pace with needs, the citizens of the city were at their wit's end.

Enter the Delhi Metro Rail Corporation – DMRC or Delhi Metro, in short. Being talked of since the 1970s, a metro system in the city did not see the light of day till very near the end of the last century. Even when DMRC was finally created on 3rd May 1995, sceptics ruled the roost and most thought it would go the way of the Kolkata Metro that took more than 10 years after the start of construction for the short 16-kilometre line to be operational in 1984. In addition, the construction of the metro at Kolkata further paralysed the already crammed and disorderly traffic along the route for the entire period it was being built. But Delhi Metro proved the sceptics wrong. Once it glided into the implementation phase around 1998, it picked up speed in a way that no one in India had seen before. DMRC opened its first corridor between Shahdara and Tis Hazari connecting East Delhi to the North of the city on 25th December, 2002. Subsequently, the first phase of construction covering 65 kilometres was finished two years and nine months ahead of schedule in 2005. Since then another 125 kilometres of metro corridors as part of the second phase were added in only four and a half years. At the time of writing, the Delhi Metro network consists of about 218 kilometres of route with 164 stations along with the Airport Express Link connecting New Delhi Railway Station to the Indira Gandhi International Airport Terminal-3. Currently being constructed is the third phase at the end of which, Delhi Metro's approximately 350 kilometres will place it amongst the largest networks in the world.



However, the success of Delhi Metro cannot be gauged or assessed in terms of its network length or other numbers. Apart from such statistics, it has been a catalyst and instrument of change for the city in more ways than one. It has completely changed the way the city travels; it has initiated major behavioural changes among the people; it has demonstrated that even major construction need not disrupt city life; it has opened up parts of the city that were considered dormant, if not dead; property prices have skyrocketed wherever metro went; the list is endless.

The most obvious change brought about by the metro is in the travel habits of the people. In spite of its fleet of buses, the bus services in the city could not provide the mass rapid transportation that the city needed. Delhi Metro has provided not only quantity in terms of the number of persons who could travel but also delivered quality in its services that match the best in any part of the world. Although the metro is only one mode of transportation, it has brought about the realization in people that they, even in India, have the choice to travel in comfort, maintain



The state of Delhi's traffic, particularly in the walled city

schedules and be fairly certain of their time of arrival at the destination. The average commuter saves about 28 minutes on each journey that is undertaken.

Providing transportation in air-conditioned comfort and reducing travel time are the obvious changes the metro has bestowed on the city. At the same time, stations are aesthetically designed and present a picture of modernity, capability, competence and completeness. Other more subtle changes have impacted the lives of many. For instance, till September 2010, Fatima Noor (name changed), a housewife of 35, residing at Ballimaran in the Old Delhi area and a mother of two, could not visit the school where her children studied owing to social barriers.

As a result, she could not be part of the parent-teachers' meeting. The school was hardly one metro station away from her house but family restrictions did not allow her to travel due to male-dominated crowds. One day, she learnt through newspapers, that the first coach of all the trains in Delhi Metro would be reserved for women. This was a window for Fatima and many like her. Since October 2010, she travels by metro to her children's school, nearby banks, the market place and other areas. For her and many other women Delhi Metro is nothing less than heaven. With the introduction of the separate Ladies' Coach, the Metro has become the favorite for women of all sections and age groups. It has opened more opportunities for women who were earlier afraid to venture out alone to travel long distances in public transportation, private taxis or autorickshaws for studies or work. It is not uncommon to see groups of women, young and old, traveling all over Delhi on the metro.

For the older residents of the city, among the favourite haunts for shopping, savouring the best cuisines or simply window shopping, were Chandni Chowk and Connaught Place. Till the opening of the metro line that connected these two areas to the rest of the city, for most Delhiites, Chandni Chowk was an exotic place that promised great food and even greater bargains in clothes, jewelry, electronics, etc. but only a few were willing to brave its narrow and congested lanes and the constant strain of

finding a parking slot for their vehicle. All that changed after the metro reached the Walled City. Chandni Chowk and Chawri Bazar have become most accessible and hence are once again popular market hubs as they were in the not too distant past. It is now quite common to park your vehicle at the station nearest your residence and then travel to Chawri Bazar by metro to reach out for world famous food chains such as *Kareems* known for its Mughlai cuisine.

While the colonnaded British era buildings of Connaught Place still retain the charm of bygone times, the market in the area had died. Over 100,000 vehicles traverse through the Connaught Place outer circle and its arterial roads everyday and managing their smooth movement despite restrictions was indeed a humungous task. Parking was impossible to find, as a result of which, few ventured to what had once been the hub for shopping and socialising.



Bird's-eye view of the Connaught Place Central Park during renovation

Busy concourse of Central Secretariat station





Construction in progress. Note the mandatory wearing of safety helmets, etc.



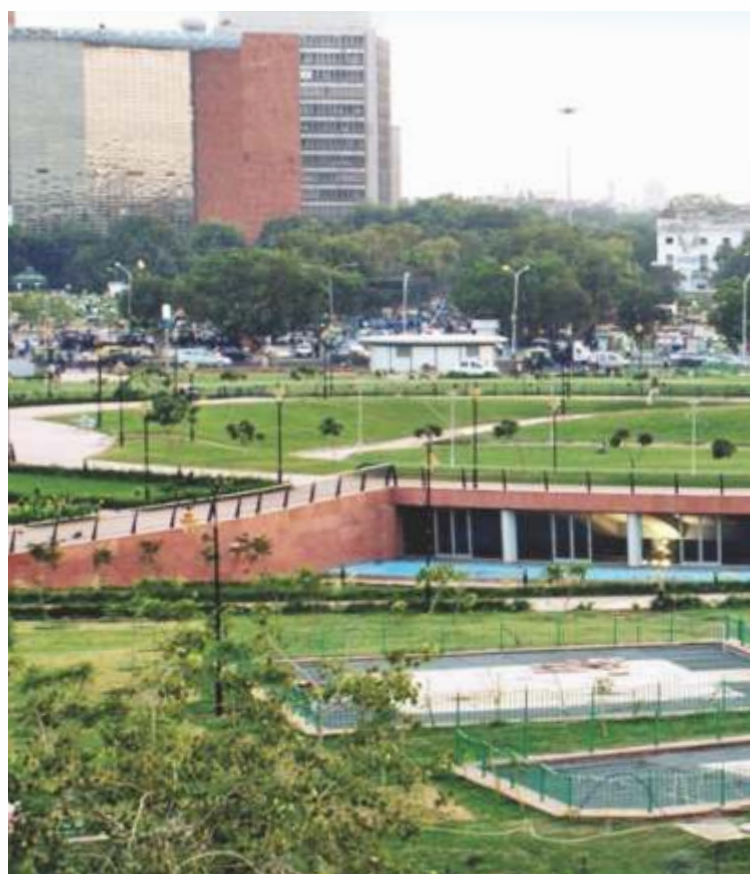
"It is not uncommon to see groups of women traveling all over Delhi"



In the Control Room

To add to its woes, the Central Park in the middle of the market had become a haven for anti-social elements and drifters leading to even more people keeping away.

Come 2005 and Delhi Metro opened the Rajiv Chowk station under the Central Park. Connaught Place got back its sheen and its lost lustre. The shopping centre is again thronging with visitors, the footfall having increased well beyond expectations. Another contributing factor to the return of popularity was the major task Delhi Metro undertook after construction of the station was over, to renovate and improve upon the Central Park and its peripheral area. The Central Park was completely



View of Central Park at Connaught Place after renovation

redesigned with new landscaping, tree plantation, amphitheatres, etc. to present a brand new look. Currently, more than 500,000 people crisscross the Rajiv Chowk metro station under the Central Park everyday and the area has become the most desirable venue for mega events like the International Yoga Day.

Ramadhir Yadav (name changed), a 45-year old vendor by



Murals adorning station walls aesthetically



profession, used to travel everyday to New Delhi Railway Station from his village in Pappan Kalan, a border area of West Delhi, by a Delhi Transport Corporation bus. It took almost two hours for him to change three buses and reach his destination. It was a common case for most of the residents in this part of Delhi, mostly unsung and unnoticed. Pappan Kalan, a name derived from the Mughal era, was an area that was a barren outlying part of the

metropolis that was not even considered for occasional visits. The Delhi Development Authority (DDA) built the sub-city of Dwarka but hardly anyone moved to live there. All that changed in 2005 when Delhi Metro reached Dwarka leading to property prices going through the roof. Dwarka is today a huge residential colony; the biggest in Delhi, perhaps in Asia. The Delhi Metro has thus been a catalyst for connecting parts of the city to the rest and resulting in inflated and outrageous property values along the route that it serves.

The journey from Dwarka to Central Delhi is now a comfortable, air-conditioned 45-minute trip. This line extends to Noida and Ghaziabad and has connected the two extremes of Delhi magically. Today, commuting between far flung destinations within the National Capital Region (NCR), such as from Dwarka to Noida or from Gurgaon to the North Campus of Delhi University is within reach of the common man, thanks to the metro. Metro pillars are the new landmarks or addresses for Delhiites. One just has to mention the pillar number nearest to one's location and the person is guided accurately to the desired destination.

Other far-reaching changes have also been effected by the Delhi Metro. One is the way construction is executed and carried out. Any major work in the country along a road meant congestion and disruption of traffic, damage to the road and prolonged delays. Delhi Metro planned their construction in a manner where disruptions were minimal, cordoning off the construction site was comprehensive and at the end of the construction period, the area was in better



Inside a Metro train

shape than before the construction commenced. At the same time, worker safety was high on the agenda. Something rarely seen in India, wearing of safety helmets, fluorescent clothing, safety boots, etc. were enforced by Delhi Metro and are now the norm for all projects in the city. Adhering to time lines has also become a norm, thanks to the meticulous time management of DMRC.

Passenger comfort and aesthetics have been given due attention by Delhi Metro, leading to similar consciousness in other areas in the city. Entering a metro station is like going into a different world, one that you would like to strive for. Passenger convenience is also high on the agenda. Therefore, you see lifts, elevators, rest rooms, etc. at all stations. You see elegant and exquisite art work on the walls of many stations, particularly on what is called the heritage line between Mandi House and Kashmiri Gate.

Behavioural changes among the travelling public are also seen. Where even the best parts of the city are not too

clean by international standards, the Delhi Metro is spic and span, thanks not only to the metro staff but also to all commuters, who ensure that the premises are kept neat and clean. Young men and even women offering their seats to senior citizens is often noted. The oldest lines are now 15 years old but are continuing to maintain the initial high standards that Delhi Metro set for itself.

Environmental impact of the metro has also been enormous. It is estimated that more than 100,000 vehicles have been able to be off the roads after the second phase became operational. This leads to reduction in pollutants being released into the atmosphere by as much as 170,000 tonnes annually. At the same time, the metro leads to traffic congestion decreasing, so that vehicles move at a better speed resulting in even more saving in fuel and lesser pollutants.

The enormous success of the Delhi Metro has sparked a metro revolution in the rest of the country. It has encouraged other cities to attempt introduction of metro systems. Today, nine cities of India (Delhi, Kolkata, Mumbai, Bangalore, Jaipur, Gurgaon, Noida, Chennai and Kochi) have operational Metro networks and at least a dozen other cities are either in the process of construction or are planning metros. DMRC has been the consultant for almost all metro projects across the country. In fact, it was the metro that integrated Delhi with NCR cities - Noida, Ghaziabad, Faridabad and Gurgaon, dissolving state borders. The metro today is more than a transport system: it is a way of life for Delhiites. It has not only changed the way people travel and calculate distances but also how they behave in public space.

Photos: Courtesy Delhi Metro Rail Corporation



Metro repair facility. Note the solar panels on the roof



Aerial view of Metro Prakriti Park

Mass Transportation

Riding the Ring Railway in Delhi

Warren Miller

Getting up early on a Sunday to take a trip on the Delhi Ring Railway! I wake at 6.30 and tumble downstairs for an early breakfast at the Ajanta Hotel. Then off on an auto-rickshaw to Nizamuddin station in South-East Delhi. Being Sunday morning, the roads are quiet, and the wide, sweeping streets (I'd like to call them boulevards) are seen to their best advantage, a far cry from the jostling weekday traffic.

Why seek out an obscure railway trip, which will be neither especially scenic nor comfortable? Perhaps because it takes you off the beaten track in Delhi and the service is likely to

disappear in the future. The Delhi Ring Railway was an early project to support urban transport for Delhi's growing population. Built to link up several of Delhi's major railway stations, and provide a loop around the city, it was similar in concept to the Petit Ceinture in Paris, or the North London railway in the UK, and like those, the demand for its services has dwindled. In fact, it was never a real success, being for the most part away from major population centres and poorly connected to feeder buses. Indian Railways provide several services around the ring on weekdays, but on a Sunday the only service is train 64091 at 8.00 a.m. which





The Ring Railway train arrives at Nizamuddin station in Delhi for its Sunday morning circuit

starts from, and finishes, at Hazrat Nizamuddin station. It runs nearly empty for most of its circuit.

Thus, at 7.30 I'm deposited at the station (it's hard to go anywhere in an auto rickshaw for less than 100 rupees these days). I decide that even on a Sunday, a ticket is a good idea (though it's likely that a few of the locals will not bother with such a nicety). I feel it is likely to confuse the ticket seller if I try to buy a ticket all the way around and back to the starting station, so I buy a ticket to Pragati Maidan, the next station and the last one on the 'ring' – cost 2 rupees – half the price of a cup of *chai**. I'm a little concerned as to finding the right platform for the train, but then I hear an announcement, "Indian Railways announce that the Parikrama EMU train number 64091 will shortly arrive at platform 1". It's almost too easy. At platform 1, a smart looking EMU (Electric multiple unit) train pulls in ready for its journey. A handful of passengers get on unhurriedly and at 8.00 prompt, the train moves off at the start of its clockwise orbit around Delhi.

* "Chai" is "Tea" in Hindi

Out of Nizamuddin, the line branches East from the main southern line and heads to Lajpat Nagar. The surroundings could be called slum dwellings, though most boast satellite dishes. While not a crowded area, people are always evident, walking along the tracks or simply sitting, and always in bright colours. India is generous with contrasts: a family of foraging pigs nearby to a modern sports stadium. But perhaps only a visitor would see this as a contrast. The stations were all built with large long platforms, but on a Sunday morning they are deserted. The Ring Railway also carries freight traffic, as a connection between the many main lines in and out of Delhi, and this will continue to be a major function, even if passenger services around the ring are terminated. Numerous heavy freights are passed, hauled by robust-looking electric locos.

We pass through Lodi Colony station, near, but not really near enough, to the popular Lodi Gardens. No one gets on or off. At Safdarjung, we sweep past a stabled luxury train, the Rajasthan Tourist train, taking a rest from ferrying tourists to the palaces and forts of Rajasthan. Here we are



A traveller watches as the newer and more convenient Delhi Metro sweeps overhead near Patel Nagar in North West Delhi

skirting around the diplomatic enclave of Delhi, but discrete walls and many trees shield the embassies from the eyes of train travellers. Shortly after, at Chanakyapuri, a mysterious overgrown siding leads off through a gate, to the splendid railway museum. The journey continues: through leafy cuttings, punctuated by mounds of rubbish, with bird calls heard above the clatter of the train. The track serves as a footpath (and loo) for the residents.

The line turns northward near Sadar Patel Marg; the station is in a rocky cutting. A road flyover at the north end is a reminder that motor traffic is growing rapidly and doubtless, outpacing the construction of new roads. After this, the surroundings become quite rural, and the train gains a respectable speed. It's short lived, however, and at Brar Square a sizeable group of well dressed ladies get on. Heading for the markets? Who knows, but they liven up the carriage. At Inderpuri, the platform has morphed into a small village, with squatters' residences, washing lines, etc. In truth, Inderpuri was only a halt, so I doubt if any travellers have been inconvenienced by this. From here on the train is much busier, and Naraina Vihar and Kirti Nagar are stations that generate some traffic, almost a crowd in fact, but everyone gets a seat. We pass under the Delhi Metro before Patel Nagar, and as if to mock the Ring Railway train, a metro train sweeps overhead on a new flyover. If the Ring Railway never quite met its objectives, the Delhi Metro has been a runaway success.

Shakurbasti station could be far from Delhi – it has all the atmosphere of a rural station: spacious platforms, shady

trees, food and *chai* vendors, and passing mainline trains. On a siding in the bushes, an ancient 6-wheel hand cranked crane slowly rusts away, forgotten by the railway administrators. 10 minutes are allowed here as the train reverses direction for its return via North Delhi. The driver and guard amble along the platform to take up their new posts. Heading back into Delhi, via Dayabasti, it's seen that the squatters along the line have found a practical use for adjacent barbed wire fencing – clothes lines, and no pegs are needed!!! The train empties out at Sadar Bazaar and the platform is briefly busy as people disperse toward their Sunday morning recreations and markets. By now the train is somewhat behind its timetable, about 20 minutes late, but no-one takes this train to be anywhere on time, certainly not on a Sunday.

Off to the markets: It's not a ladies-only carriage, but most of the travellers on a Sunday morning are housewives heading to the markets





Seen from the Ring Railway at Shakurbasti station; a Sunday morning nap on the platform

Full circle: passengers alight after arrival of the Ring Railway service at the station where it commenced, Delhi's Hazrat Nizamuddin interchange station



Train number 64091 trundles through New Delhi main station, almost trying to slip un-noticed among the comings and goings of mainline trains to all parts of India. Then the colonnades of Connaught Place are sighted briefly. There's not much of note on the final leg back to Nizamuddin: a new footbridge being built at Shivaji Bridge, a glimpse of the back of Humayun's tomb, and then almost immediately the train is back where it started from. The 90-minute timetable has stretched to nearly 2 hours, but it's time well spent, enjoying an informal look at the more mundane aspects of Delhi and enjoying the ambience of a leisurely and little known train service that may not continue much longer.

About the Author:

*Warren Miller is an Australian rail enthusiast, who chanced upon a copy of the first issue of **The Rail Enthusiast** at the National Rail Museum. He had undertaken this journey on the Ring Railway way back in 2012 but did not find an outlet where he could get it printed. We are happy that the **Rail Enthusiasts' Society** has provided him this platform. All photographs are by the author.*

Mass Transportation

Moscow Metro

Sudhir Kala

Like everything else in Russia, the Moscow Metro has been built on a grand scale. It serves the city of Moscow and the neighbouring cities of Krasnogorsk, Reutov, Lyubertsy and Kotelniki. It had a modest beginning when it opened in 1935 with one 11-kilometer line and 13 stations. It was the first underground railway system in the erstwhile Soviet Union. It has grown exponentially since then and today comprises

of 14 lines totalling about 350 kilometers, making it the fifth longest in the world. If the Moscow Central Circle is included, the length is over 400 kilometers.

Earlier this year in May, along with a few friends, I travelled to Russia and spent a memorable three days in the Russian capital. We had read about the Moscow Metro and were keen to have a look at it. Not that we intended to travel over

Moscow Metro main station





The station foyer



To the trains



The long escalators



The train



The platform



Inside the train

the entire network but only wanted to get a feel of the system. Built as one of the showpieces of the socialist system, it definitely merited a visit.

Thus, on a lethargic Saturday afternoon, at around 2 p.m. we made our way to the main metro station of the city. We chose this time as it was a non-rush hour period and we expected the crowd to be light. Even before we entered the metro itself, we were entranced by the entrance to the station – classical, majestic, grand and magnificent. As we entered, our guide told us that each station on the metro has thick steel shutter doors so that the stations could be converted to anti-atomic bomb shelters in case of need. I must say that these doors were very unobtrusively located



Trofim Lysenko, a Soviet agrobiologist, best known for his theory on environmentally acquired characters



A Ukrainian mural

as we could not find them till pointed out by the guide.

Everything about the metro was large, grand and conveyed a feeling of grandeur. For instance, we went down to the platforms on long quadruple escalators, perhaps 80 meters or so in length, the longest that I have ever seen. Ceilings were brightly lit by globes. The entrance foyer had chandeliers. And this was not just the main station; all stations were equally grand and ornate and exuded a charm of their own. The accompanying photographs will give you some idea of what I am trying to convey.

We had expected a very high level of security; its lack took us by surprise. Not that there was no security, but what



Soldiers on the ceiling



Another view of the ceiling

existed was very nominal. The guards and metro staff appeared to be quite accustomed to tourists. Apparently, this is one of the “must visit” parts of the tourist itinerary at Moscow. Photography was not a problem and you could click as many photographs as you wanted. Reminded us of the “No Photography” signs you see in Delhi Metro and even the regular Indian Railway stations. In this day and age, such restrictions are totally out of place and will not prevent a person with wrong intentions from taking all the photographs that he or she needs. The earlier such restrictions are removed, the better.

We were intrigued to find that old communist signs were prevalent at a few places and had not been removed. Ironically, many of the stations are named after the erstwhile Soviet republics: poignant that this celebration of unity is all that is left of the former Soviet Union. For instance, one of the major stations we crossed was Ukraine. A mural depicting a Ukrainian scene adorned one of the walls. You will find murals at virtually every stations, all representing patriotic themes: soldiers, farmers, life of the ordinary man, etc. in the various republics. Another theme that predominated was the monumental struggle against Nazi Germany during the Second World War. The architecture is not modern chrome and glass; the winter palace of the Czar appears to be the inspiration.

What impressed me was the very high acceleration of the train. The top speed was not too high but this speed was attained in a very short time. This being a slack period, the train was not crowded. The seating was very similar to the Delhi Metro with seats along each side and a vacant space in the middle for standing passengers. Obviously the trains are crowded during the peak hours as we were told that the Moscow Metro carries about 10 million passengers each day on about 10,000 trains.

We travelled only 5 stations before we disembarked. But even this short ride was enough to convince us that for any visitor to the city, a visit to the Moscow Metro must not be missed.

Photos: Courtesy the author



A rural scene – on the ceiling again

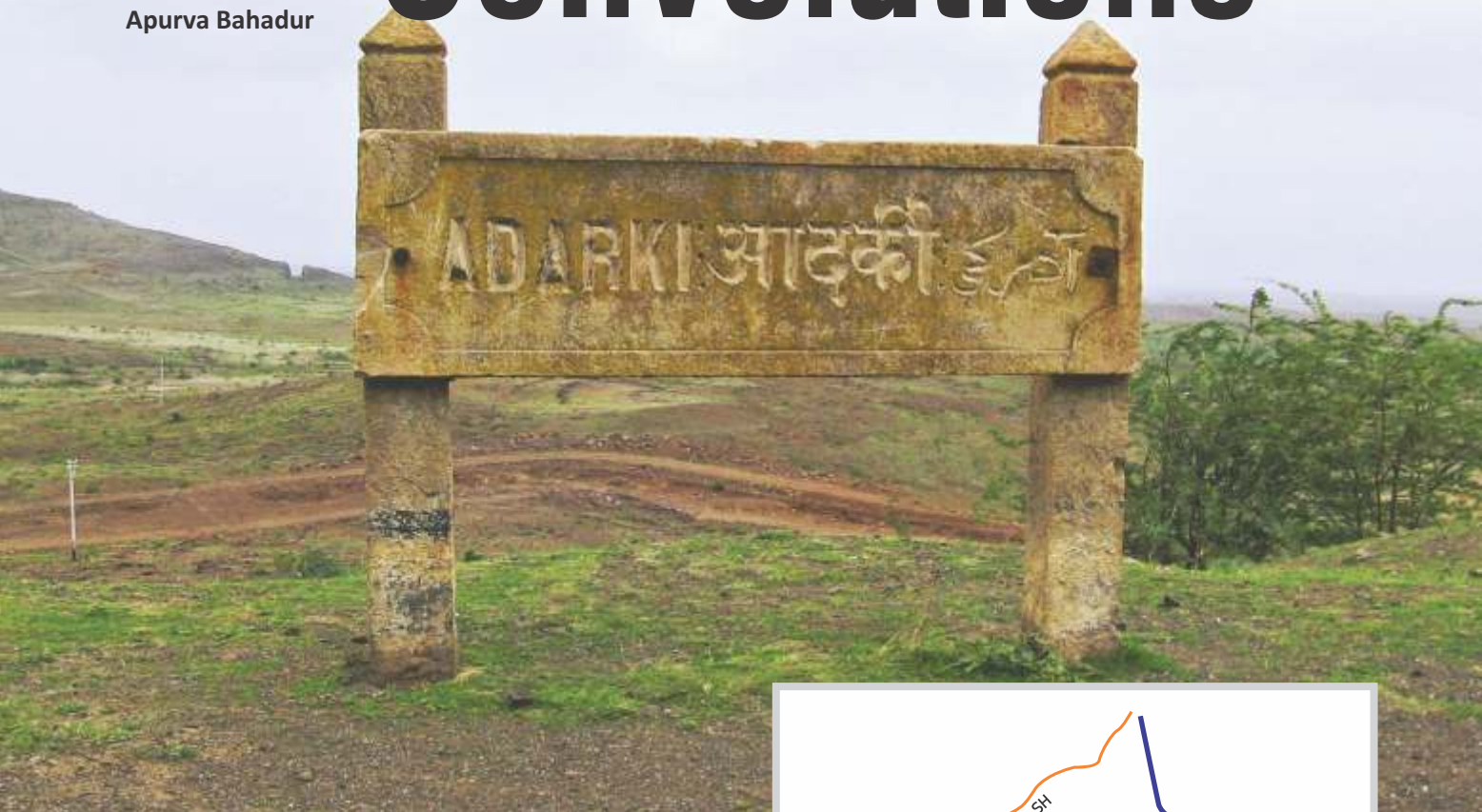


Socialist signs can still be seen

Photo-feature

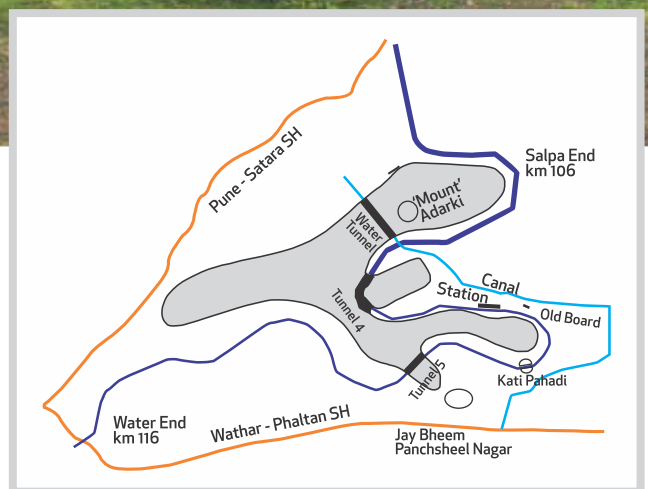
A Paradise of Convolutions

Apurva Bahadur



Adarki is a tiny station, about 109 kms. from Pune on the line to Miraj. For railfans, this is a haven of premium quality single-track diesel hauled main-line action, set amongst memorable curves, guarded by tall mountains and passing through breathtakingly deep rock cuttings. The location's main claim to fame is the spectacular horseshoe curve that is visible from behind the station platform. If you climb the mountains in front of the station, it is apparent that there is yet another reversal of tracks in the other direction. However, I hesitate to call that curve as a horseshoe, as it is visible only at an elevation and not at ground level.

Adarki does not have much passenger volumes. Only 2 passenger trains stop here in each direction during a 24-hour period. About 7 daily trains and about 10 freight trains roll through in each direction in the same 24 hours. Through the week, around 15 non-daily passenger trains also pass through. As the Pune-Miraj-Hubli-Bangalore route was



meter gauge prior to the 1970s, Adarki too has its share of MG artifacts. These include the old alignment with sharper angles of curvature on embankments or through cuttings. You can also see stone arch viaducts and an engraved stone station nameplate that is located some distance away from the present day platform.

A deep sense of tranquility rules this place. Apart from the bells tinkling around the necks of grazing cattle, the lack of sound actually hurts your city-bred ears. Yet, gusts of

unexpected intense wind will buffet you around. In the appropriate season, bursts of sudden rain will drench you at regular intervals. But the quintessential Adarki experience: the gentle excitement of detecting a faint mournful sound of the distant horns, peaking to a frenzy several tens of minutes later, when the train will do that curve before it thunders through, right in front of you.

Apart from these curves, the location boasts of two tunnels, # 4 and # 5, that permit movement of trains through the mountains. Another notable feature is a small hill that is split right down the middle to pass the tracks: this is the so-called 'Kati Pahadi' of Adarki.

When I started railfanning, more than two decades ago, the remotely located Adarki station did not have any source of water, potable or otherwise. To meet the needs of the station staff, the railways attached a converted eight-wheeler milk tanker to carry potable water. The 315 Down Pune-Kolhapur passenger hauled this tanker on alternate days. During the passenger's halt at Adarki, the station staff would top-up the ground storage tanks, as the train waited.

When the vacuum braked 315 Down evolved into an air-braked rake, now renumbered as the 1609 passenger, the

older 8-wheeler vacuum-braked tanker could not run anymore with this rake. The water carrying duty was performed by a large plastic moulded tank, fitted in the luggage area of the front brake van. Simultaneously, a major construction project was underway in the area. This was the Salpa irrigation canal, which bisected the horseshoe curve and passed below the railway line into the surrounding mountain through its own water-carrying tunnel!

The canal helped bring much needed ground water in this area. Around the same time, the station got a potable water pipeline and the latest avatar of the passenger trains, the 51409/10 (5-digit renumbered version of the 1609/10), do not carry any cache of potable water for Adarki station.

Will Adarki remain a raifan's paradise? Track realignment, doubling, and the eventual electrification are all in the pipeline. So, enjoy the beauty and splendour of this amazing location before "modernization" will eventually rob it of the rustic charm and raw sensuality. Through images on this and the following pages, I invite you for a virtual tour of Adarki and hope that it will generate adequate interest for an actual visit to this idyllic location in the near future.



























Photo Captions

- Page 22* The ancient station board from the meter gauge era
- Page 23* Near side portal of tunnel No. 4
- Pages 24 & 25* Evening ambience at Adarki
- Page 26 (Top)* A southbound BCNHL rake from Salpa end, on one of the arms of the horseshoe curve
- Page 26 (Middle)* Same southbound BCNHL rake visible on the other arm of horseshoe curve
- Page 26 (Bottom)* Potable water for Adarki by passenger train
- Page 27 (Top)* A view of the water carrying tunnel for the Salpa canal
- Pages 26 & 27 (Bottom)*
Adarki is more used to cross trains on a single line section than serve passengers
- Pages 28 & 29* A BCNHL threads through the 'Kati Pahadi'
- Page 30 (Top)* A BTPN rake approaches tunnel No. 5
- Page 30 (Bottom)* Looking over the far side portal of tunnel No. 5
- Page 31* Leaving the near side portal of tunnel No. 5
- Page 32 (Top Left)* Deep cuttings that line the track towards Wathar
- Page 32 (Top Rt.)* At the end of Adarki embankment
- Page 33 (Top Left)* The embankment towards Adarki has memorable curves
- Page 33 (Top Rt.)* On the embankment approaching the cuttings of Adarki
- Pages 32 & 33 (Bottom)*
Adarki station, near side tracks, Salpa canal and the tracks at the opposite side of the horseshoe curve
- Page 34* A southbound train emerging from tunnel No. 5
- Back Cover* Train 315 passenger departs Adarki

Little Known Railways

TRAINS IN THE MOST MILITARIZED ZONE IN THE WORLD

Deepak Sapra

I am in the border zone on the South Korea-North Korea border, on the South side. Called the DMZ, or the De-militarized Zone, it is actually the most militarized zone in the world: a four kilometer buffer between North and South Korea, created through an armistice agreement in 1953. The armistice is still in place and the two Koreas are still technically at war, making this the longest unfinished war in the world. The Korean War separated millions of families and created two very different worlds either side of the 38th parallel. The two worlds exist in the midst of tension, propaganda and rhetoric.

A small drive away is the Dorasan train station, which has a board notifying that Seoul (the capital of South Korea) is 56 kms and Pyongyang (the capital of North Korea) 205 kms away. The significance of this station is that it's in South Korea, but the track connects to North Korea, though the train line between the two is not used these days.

Attractively painted locomotive, hauling the train to Seoul



It is not everywhere that one can see a connection between Seoul and Pyongyang: Dorasan is one such place

The two Koreas agreed, in a joint declaration in 2000, to connect the Gyeongui railroad line. Under military control, the barbed wires and mines were removed and Dorasan station was opened in 2002. The station



was constructed in a spirit of peace and unity, the roof of its building showing a figure of clasped hands, signifying the aspirations (and hope) of unification.

As of now, though, the only people in the station are soldiers and tourists. The station is squeaky clean and has impressive signboards proclaiming the message of unity. "Not the last station from the South, but the first station towards the North," says one of them.

A proposed map of a Eurasian rail line, which would go from Dorasan in South Korea to the next station North, Panmun in North Korea, then on to Pyongyang, further on to China, then Mongolia, Russia, Central Europe, France and all the way up to the UK, is



The embattled, bombed derelict steam locomotive



The ticket area of Dorasan station

prominently displayed. The electronic signboard says: "When the TKR (Trans Korean Railway), the TSR (Trans Siberian Railway) and the TCR (Trans China Railway) are connected in the future, Dorasan station promises (sic!) to emerge as the starting point of the transcontinental railroad.

All of this is a far cry from the tense atmosphere in the DMZ, a few kilometers away. Even the South Korean

army guards are smiling at Dorasan station (the ones in the DMZ are dead serious and business like). Some of the army guards at Dorasan even oblige for photos and selfies with tourists.

I buy a ticket from Dorasan to Pyongyang as a souvenir, even though there is no train for now. The ticket is a keepsake, a souvenir for what might be, some day. I also buy a platform ticket – it's called a station

entrance ticket – and get it stamped.

I get on to the platform. There are a handful of trains that go to Seoul every few hours. The loco is nicely decorated. The outer colours on the coaches depict children holding hands. The message of unity is all over. Inside the train, it's a standard chair car

configuration. It's spic and span with very nicely done interiors. However, there are hardly any passengers, as most people prefer the trip to Seoul by car or bus.

Moving out from Dorasan, I go towards Imjingak. That is where the 'Bridge of Freedom' is located. The bridge crosses the Imjin River. It is a former railway bridge



My stamped ticket



The utopian railway route from Dorasan, all the way to Europe



The train to Seoul with a picture of children holding hands: a message of unity

and was used by repatriated soldiers returning from the North.

There is an old, rusty, derelict steam locomotive here, which had derailed due to bombs during the



The board with messages from across the world - all speaking peace and love

A lone Korean soldier patrolling the platform

Korean War. The train being hauled by the steam locomotive was attacked on its way to Pyongyang to deliver war supplies. The locomotive has more than a thousand bullet holes, 1020 for railway aficionados. It was destroyed at the nearby Jangdan station due to the bombing.

I touch and feel the loco from different directions. There is rust all over. There is a board nearby, with chalk provided for visitors to write peace messages. It's a crowded board with several messages of peace. I write my own peace message and sign it by writing - "♥FROM INDIA".

As I head out of the DMZ, I am once again conscious of the role that trains have played, and will continue to play, in connecting people and how they can be far more an instrument of unification than of divisiveness.

Photos: Courtesy the author



Rail Modelling

Wrightsville Port: An American Layout, Made in India



Kaustav Chatterjee

Wrightsville Port is an imaginary port in the United States and assumes to be a sister port of Wilmington, North Carolina. Wrightsville, North Carolina, is actually a real place that is pretty close to Wilmington. However, it doesn't have any port and is well-known for its beach. As it happens to model train enthusiasts in India, we cannot normally choose to model our own railroad because there are hardly any commercial models available of the Indian Railways in any scale; we end up buying foreign trains and create a fictitious story to fit them in a suitable environment to quench our thirst of creativity and the desire to play with trains. There are a few of us who actually take the pain to do enormous background research to make it a replica of a real 'prototype'. Others like me? We pick up a generic concept and try to fit it into our imagination. That's how Wrightsville Port was born – I picked up an Ian Rice plan and modified that from HO to N scale, and then, while trying to figure out which locale should I be fitting the layout to, I decided on the above story of 'what if Wilmington, NC, had a sister port.' Since I always liked tunnels and a little elevation on my layout, I also added another 'what if' to the list: what if the port was built right at the heel of a small hill, so that I

could bore a small tunnel to create that interesting scene of a train entering and emerging from it.

As the model grew over the years, I constantly focused on maintaining the authenticity of the locale and the period (1960s), hence all my buildings in the tiny shelf portion of the layout that represents the town of Wrightsville have taken inspiration from various American buildings. Some

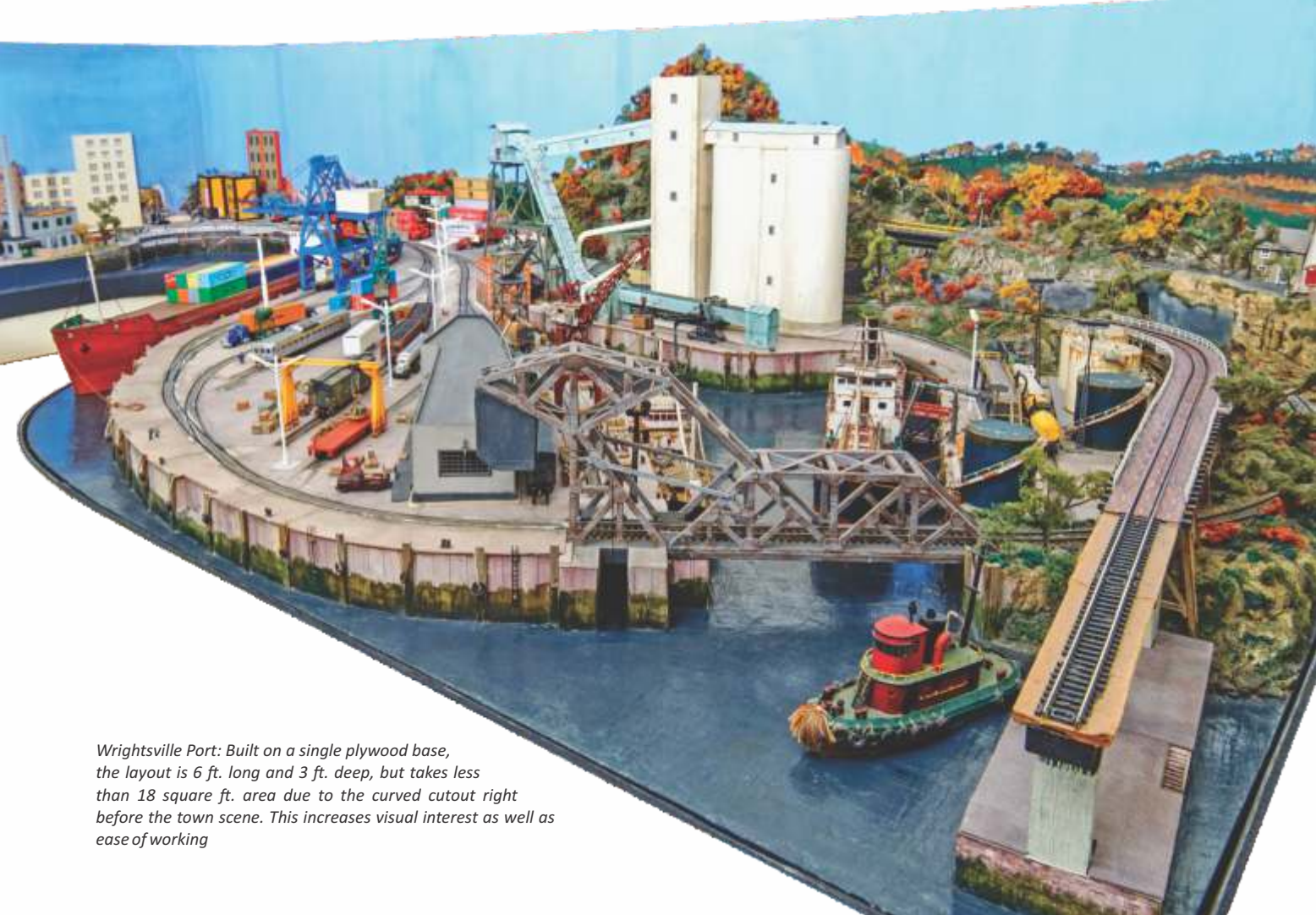
A freight train arrives. Except the tall hotel on the left, all other buildings are cardboard models



The town scene at night. Some noticeable night-time details are the headlights of the vehicles (including that tiny motorbike) and the interior of the foreground buildings

The port at night showing the 'new' (in the model's time line) container facility





Wrightsville Port: Built on a single plywood base, the layout is 6 ft. long and 3 ft. deep, but takes less than 18 square ft. area due to the curved cutout right before the town scene. This increases visual interest as well as ease of working

A typical day in Wrightsville Port. While the faithful NW2 switches a small cut of 3 flat cars, the port workers are busy in their day to day work around the large freight house. The lone RDC diesel electric railcar provides the only passenger service to the port primarily for the port workers



are even from various cities in North Carolina. The backdrop scenes are tiny paintings of various North Carolina cities from the 1960s. Though the available space was small, I managed to create an intriguing townscape through which the train approaches the port. Special attention was paid to create a suitable night scene too, hence every building has interior lights, and some foreground buildings have complete interior details including people performing various activities – a very difficult task indeed with a scale where a 6 ft tall man measures about 11 millimeter! Care

The quay that handles most of the freight in Wrightsville Port. The Bascule bridge in the foreground opens to grant ships access to the facilities



The oil facility where an old tanker ship, Sirius, unloads its cargo while the Bascule bridge opens to make way for an incoming barge





The ever busy quayside that handles all sorts of freight. Currently, sacks of grain are loaded in the holds of the small freighter named Severus while cargo is loaded in boxcars



Note the tall grain facility with its step conveyor structure and the lighthouse on the right



The port at night showing workers at night shift

was taken to install headlights and taillights in all the vehicles, including a couple of N scale motor bikes. I believe the town captures the 'feel' of a small American town pretty well despite its creator not setting foot in that country ever in his life! I consider that in itself as an achievement.

Now, coming to the main attraction and the focal point of the theme, the Port of Wrightsville, modeled as a small but busy port on the Atlantic. The port has a container facility – the 'new age' concept in the layout's present time, i.e. the decade of '60s. You can find the 'large' freighter 'Betelgeuse' moored to the quay while a brand new container crane loads the containers. An incoming train takes an interesting S-turn behind the large container crane and moves toward the bascule bridge, right beside the main quay where most of the other freighters are handled. As of now, you can see a small freighter, Severus, busy unloading its contents. One of the two large cranes also loads heavy machinery boxes to a Gondola car. As the train crosses the bridge, it goes underneath an old coal trestle, keeping the oil facility on its left where you can find Sirius, a small steam era oil tanker, that is busy unloading fuel. Further ahead, on

its way to take a 180 degree turn toward the entrance of the port, the train crosses a concrete bridge to enter the small tunnel while the tall lighthouse on top of the hill looks on. Emerging from the tunnel, the train plays hide and seek behind the tall grain storage silos and the elaborate conveyor belt before emerging again at the throat of the reverse loop. This throat essentially leads to all the different spurs where the trains drop and pick up cars.

Designed as an operation centric layout, nearly 80% of the track in the layout is modeled as concrete embedded track in the port – a tricky and difficult modelling in such a small scale. I used styrene and cardboard as the main material to achieve the look, while not affecting the operational ability of the trains. Leaving one factory, all other structures in the

layout are custom built using various materials: cardboard, styrene, plastic and wood. The same goes for all vessels – all are modeled on actual prototype ships and they are all cardboard models. Given the high cost of acquisition of trains and other necessary things like tracks, switches, electronics and figures, I had to improvise and use non-conventional ways to build my other components, mostly using throwaway material and fancifully calling it 'scrap-building'.

After 6 years of effort on building the layout and moving to 5 different homes in 2 different cities (which is a testimony to the layout's agility and portability), one might think that it is time to move on to something new. While that is true and I am preparing for a new project in HO scale, this one is far from over. I am yet to complete a boat yard, the coal discharge facility, an open shade and a few other small details before I can finally call it 'over'. However, given how this tiny little Lilliput-land has stayed with me through thick and thin and how it inspired me to take up new challenges despite steep hurdles, I doubt I will ever be able to part with it and leave working on it. In the end, this tiny little world has grown to be my friend.

Photos: Courtesy the author

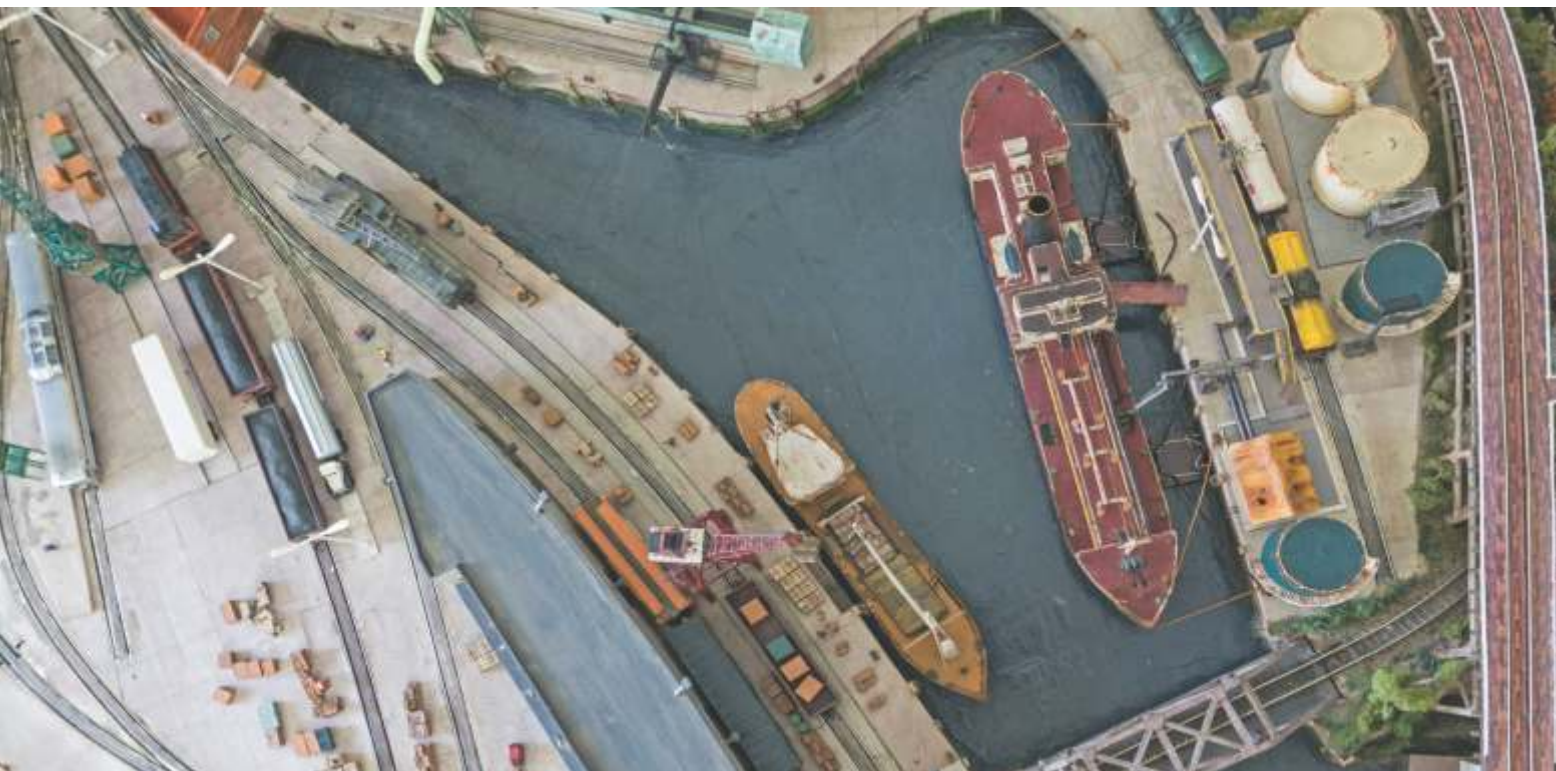
A 'satellite' view of the port showing the main quay, the oil facility and part of the grain facility



The main port office near the throat of the loop. Notice the remnants of a steam loco rotting in the small junk yard beneath the conveyor belt tower



The unfinished part of the port. There will be an open shade where you see those crates in the foreground



In Search of Steam

Geared Locomotives



The 3-truck "Shay" on display at Northwest Railway Museum at Snoqualmie

Like rail systems the world over, the railways in India commenced more than a century and a half back by running all services with steam locomotives. In the 1920s, 3 sections, Bombay-Poona (now Pune) and Bombay-Igatpuri out of Bombay (now Mumbai) as well as Madras-Tambaram out of Madras (now Chennai) switched to electric traction. It was only in the 1950s that steam started giving way to large scale electric and diesel locomotives. In any case, steam remained operational on the main network as recently as the late 20th century. Even today, steam locos are continuing to run regular services on the Darjeeling Himalayan Railway and the Nilgiri Mountain Railway. Be that as it may, few, if any, persons in India would have worked with or even seen a "geared" steam locomotive. All steam locomotives that ran in India were the conventional "coupling rod" locos.

The 3 vertically placed cylinders of the Shay



Geared locomotives were developed in the USA primarily for use by logging companies, where the need was for locomotives that could work on frail track, negotiate sharp bends and haul heavy loads up steep grades. They achieved these virtually unattainable requirements by driving the wheels through direct gearing to each and every wheel. This resulted in a uniform torque in the driving wheels and since the latter were not coupled on a rigid frame but were on 2-axled bogies, they could negotiate hairpin bends built on precipitous slopes.

In the early years of the 20th century, West Virginia in the USA lead the way with about 5000 kilometers of logging railway lines and a large number of such geared locomotives. However, the **Rail Enthusiasts' Society** had occasion to visit the North West of the country and came across two geared locomotives on display there.

One was a “Shay” locomotive at the Northwest Railway Museum at Snoqualmie in the state of Washington, USA. Not far from the city of Seattle, this is a small but well-kept museum built around the Snoqualmie railroad station. Referred to as the Snoqualmie Depot, the latter was constructed by the Seattle, Lake Shore and Eastern Railway in 1890. At the time of its building, the Depot was unusually elaborate in comparison to the modest size of Snoqualmie at the turn of the century. In 1975, the then owners abandoned the line, and donated the depot building and several miles of track to the Northwest Railway Museum. Snoqualmie is a small town even today, but the Victorian style station building is reminiscent of a depot in a much larger city, with its beautiful wood panelled rooms, its

The Snoqualmie Depot



The Heisler geared locomotive at Elbe station

asymmetric design and even a turret. In 1981, the Museum rehabilitated and restored the Snoqualmie Depot back to its 1890s appearance.

Unlike the conventional coupling rod locomotives, the Shay has its cylinders mounted vertically on each side of the locomotive. Three cylinders on either side drive crankshafts which drive the wheels on that side through universal shafts and gears on the axle of the driving wheel. The design





was developed at the end of the 19th century by Ephraim Shay, hence the name. The Shay on display was a 3-truck Shay built by the Lima Locomotive Works at Ohio in 1904 for the Newhouse Mines and Smelter Company in Utah. After changing hands a couple of times, the locomotive ended being stored in 1951 at a sawmill and was donated in 1964 to the Northwest Railway. It was moved to the museum in 1969.

Although no such geared locomotive has ever worked in India, a model Shay can be seen at NeverEnuf Garden near Gurgaon. NeverEnuf Garden is a model railway haven developed by Adesh Grover, a rail modeller and member of the **Rail Enthusiasts' Society**. A picture of the Shay model can be seen alongside.

The second geared loco turned out to be on display at the Mt. Rainier Railroad and Logging Museum which is alongside the railway station at Elbe, en route from Seattle to Mt. Rainier. This locomotive was built by the Heisler Locomotive Works in 1912 and operated by the Pickering Lumber Company, when it was known as PLC # 10. The Mt. Rainier Scenic Railroad, that now owns the locomotive, renamed it "R.J. 'Bud' Kelly".

This locomotive had the legend "Silver Creak Logging Company" painted on the tender. This could well mean that the tender is of some other locomotive and has been attached to this loco at the museum.



One of the cylinders of the Heisler loco

Our steam loco friends from the Indian Railways are requested to have a close look at the locomotive. The two cylinders are placed in a 'V' on either side of the loco at roughly the midway point of its length. The cylinders are driving a crankshaft at the centre of the loco and from this crankshaft, one universal shaft on each side drives gears on the front and rear bogie. Each bogie is 2-axled, with both axles driven. A similar drive arrangement was used on the YDM3 and YDM5 class of diesel locos in India. The only difference was that the drive was from two electric traction motors slung below the loco.

While it is interesting that geared steam locomotives have been developed that had no coupled wheels, the Indian Railways had a design where a diesel-powered locomotive worked with coupled wheels. This was the WDS4 class hydraulic loco series where the three sets of wheels were coupled as they are in a conventional steam locomotive. The drive from the MaK diesel engine was to the centre wheel and transmitted to the front and rear wheels through coupling rods.

Photos: Archives of the Rail Enthusiasts' Society

Model of a 3-truck Shay. Note the universal shafts that are driving the wheels from the central crank shaft.



Museums

East Japan Railway Museum, Omiya

Vinoo N Mathur

The Japan National Railways were privatized in 1987 with the creation of six privately managed passenger rail companies and one freight railway company. Three of the passenger companies operate Railway Museums. The West Japan Railway manages a museum at Kyoto, the Central Japan Railway at Nagoya and the East Japan Railway at Omiya on the Northern periphery of Tokyo in the Saitama Prefecture. There is healthy competition between the museums and a constant endeavour to improve.

A visit to the Omiya museum was an enthralling and enriching experience. The author had the privilege of being

shown the main exhibits by the Deputy Director of the museum. This museum not only provides entertainment but research and learning opportunities as well. The first railway train ran in Japan in 1872 and the earliest Steam Locomotive, No. 1, that was built in 1871 and imported from the United Kingdom, a 2-4-0, is carefully preserved and is considered a National Cultural Property and Railway Monument. Interestingly, the earliest wood burning locomotives used on the Northern Hokkaido Island were imported from the United States in view of its proximity and what were considered similar terrain and conditions. One such locomotive, named 'Benkei', with a funnel shaped chimney, of 1880 vintage, is a prominent exhibit. The only

A general view of the museum from the first floor gallery with the large exhibits around the Turn Table





Japan's first steam locomotive, manufactured in UK in 1871

remaining 'Mallet' locomotive (1913) is preserved with boiler tubes exposed to explain its working. There are a few other steam locomotives including the first high speed locomotive Class C51 (1920) that also hauled the Imperial Train with the Imperial symbol of the Cherry prominently displayed below the smoke box.

There is a wide range of coaching stock on display including a replica of the oldest coaches that initially ran from Tokyo (Shimbashi) to Yokohama. There is an interesting story of when the Japanese first started boarding a railway coach: they would take off their shoes on the platform as they would while entering their own homes. As a result, shoemakers at Yokohama did roaring business, whereas, there were a pile of shoes left behind at the originating station. Perhaps the most precious possessions of the museum are the ornate Imperial Saloons preserved in large glass partitioned lodgings and the earliest one, built 1876 during the Meiji period, is again a National Cultural

First high speed steam locomotive (1920). Used to haul the Imperial Train as seen from the flags and Cherry Symbol of the Emperor



Property and forms a part of the National Heritage collection. There is a host of rolling stock of the last forty to seventy years including AC Three Tier coaches introduced in the 1970's to cater to growing business travel, electric multiple units (EMU), diesel and electric locomotives and the earliest Shinkansen Bullet Trains which were introduced in 1964. In some of the EMU coach floors, there are cut out glass windows so that visitors may see and study the traction motors below.

The lay out of the museum is most impressive with the exhibits displayed under a massive single roof: the centrepiece being a turn table in the middle of the exhibition hall. There is also a first floor gallery all around from where one may look down upon the large exhibits below. A daily event, which creates much excitement, is the operation of the turn table and is popular with visitors, particularly children. The museum caters to children of all ages: there is, of course, the Shinkansen shaped small Toy

Locomotive named 'Benkei' used on Hokkaido Island



The earliest Imperial Saloon, manufactured in 1876 for the Meiji Emperor





A First Class Observation Car (1930) which ran on the Tokkaido main line

Train for a joy ride, a play area for toddlers where they can familiarize themselves with rails, engines and coaches and a more serious 'Driving Park' where teenagers and adults can drive small rail cars in an open-air setting with track and rail cars provided with lineside or cab signalling. They also get a feel of the Automatic Train Supervision (ATS) and Automatic Train Control (ATC) systems that are used on the JR main lines.

The most popular items in the museum, are, perhaps, the simulators where visitors can drive a Shinkansen, various types of conventional trains and even a steam locomotive with the real feel on the footplate of the sounds and rattle of an actual steam engine with functional gauges, controls and a whistle. In fact, the steam simulator is also used for the training of actual steam drivers who operate tourist trains. This perhaps is one of the very few steam locomotive simulators that exist anywhere in the world.

Another outstanding functional display is the 'Railway

A view of the 'Railway Diorama' showing miniature trains



Diorama', a massive model room with miniature rolling stock, 1/87 scale in case of Shinkansen and 1/80 scale for conventional lines, representing most types on the East Japan Rail system. Built on the 16.5 mm HO gauge the layout depicts all types of countryside, rural & urban, large & small stations, various types of bridges, viaducts and buildings. The total track length is about 1200 metres with



One of the original Series 21 Shinkansen units manufactured in 1964



The steam locomotive simulator with museum Deputy Director in the Driver's seat

approximately 1400 carriages. The computer controlled train operation has a number of separate programmes that can be run. The author had the good fortune of viewing the facility one day before a completely revamped and upgraded display was to be inaugurated, when finishing touches were being given. There is a stepped seating arrangement, from where visitors can get the thrill of watching model trains in operation.



A model E5 Shinkansen train set passes over a viaduct with a Metro service on the conventional line below

There is much else the museum has to offer for which a short two-hour visit is clearly inadequate. There is a 33,000-book library, a kids' library of picture books, a Science Station focussing on the Science & Technology of the Railways, a Railway Cultural Gallery bringing in the perspective of films, music, art and literature, collection of rare Railway photographs, a popular Museum Shop and a range of catering facilities including the facility of buying a 'Bento Box' (Lunch Box) at a stall and eating it in one of the parked coaches, a fast food restaurant and an upmarket Dining Car based facility. Japan is a nation that loves its Railways. That is truly reflected in the meticulous planning that has gone into the creation of the facility and the tender loving care with which the exhibits are maintained. A most memorable experience.

Photos: Courtesy the author



Toddlers play area with rail & rail cars to play with



A view of a major terminus



Everyone enjoys a joy ride on a toy train shaped like a Shinkansen



EF 55 electric loco. It worked the Limited Express on the Tohoku main line

History

INDIAN RAILWAYS CENTENARY: 1853-1953

J L Singh

Whether it is the life span of a human being or the completion of 100 runs in cricket, a century is a century and is always a significant event. In 1953, when the railways in India completed a century of commercial operations, the newly constituted Indian Railways celebrated the milestone in more ways than one. One was the issue of a postage stamp along with an Indian Railways Centenary First Day Cover. The stamp shows the locomotive "Express" on the left and a WP on the right. The Express (No. EIR 21) was a sister of the Fairy Queen (No. EIR 22) and both had been pressed into service in 1855 on the East Indian Railway. The Fairy Queen has been certified by the

WP locomotive as well as one of GIP-1, one of the first eight locomotives that had been delivered to the Great Indian Peninsula Railway. Three of these locomotives, *Sindh*, *Sahib* and *Sultan*, worked the first train in the country on the 16th of April 1853.

The main event to commemorate and mark the historic event was held at the Railway Exhibition grounds at New Delhi on the 16th of April 1953, exactly hundred years after the first train run from Bori Bunder to Thane in Bombay (now Mumbai). The then Vice President, Dr. S. Radhakrishnan, deputising for the President, an indisposed Dr. Rajendra Prasad, was received at the ceremonial

It would interest our readers to know that before a stamp is issued a number of die proofs are made and from them the final stamp is selected. In the case of the centenary stamp, six die proofs were prepared including some of 4½ Annas (At that time one Indian Rupee was equal to 16 Annas: 16 Annas were replaced by 100 paise in 1958 during the process of adopting the metric system). A 2½ Annas black stamp was finally selected.



Die-Proof 4½ Annas,
Black



Die-Proof 2½ Annas,
Blue Green



Die-Proof 4½ Annas,
Blue



Die-Proof 4½ Annas,
Blue Green



Die-Proof 2½ Annas,
Blue



Selected & Issued design
2½ Annas, Black

Guinness Book of Records as the world's oldest locomotive in working order. The WP was a Pacific type steam locomotive, suitable for passenger train working. The first 16, built by Baldwin Locomotive Works, Philadelphia, had been inducted in 1947, by the fledgling Indian nation. 300 more were in service by 1953. Later built in India by the Chittaranjan Locomotive Works, the WP was the mainstay of passenger train operations till the advent of diesel and electric behemoths. The First Day Cover has a sketch of a

platform on State Entry Road by the then Minister for Transportation and Railways, Mr. Lal Bahadur Shastri, and other dignitaries. The party was moved to the exhibition grounds by a special train arranged for the purpose. An interesting invitee to the function was the then longest serving employee of the Indian Railways, Mr. Durga Manoo, who had been recruited by the Indian Midland Railway way back in the year 1900. There was obviously no retirement age as Mr. Manoo had already put in 53 years of his service



First Day Cover with cancellation of 16.04.1953

and must have been about 70 years old.

Similar commemorative functions were arranged at virtually all headquarters of the newly formed zonal railways. There were only six zonal railways then – Central, Eastern, Northern, North Eastern, Southern and Western – against the 17 zones that exist today. The most impressive function was conducted at Victoria Terminus in Bombay, the site of the first train run that was being commemorated.

Apart from special functions on the 16th of April of 1953, a Centenary Exhibition was also organised to mark not only the completion of 100 years of the railways in India but also to show case the contribution of the railways towards the continuous progress in the country. The following is an extract from the “Indian Railways Centenary Exhibition – Official Guide New Delhi - 1953”.

“Today the Indian Railways cover a vast network of 34,123 route miles and operate as the single largest nationalised

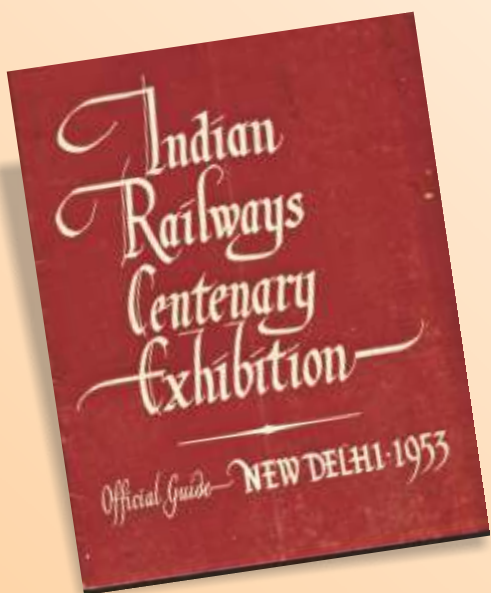
undertaking in the country. Bigger than other systems in Asia, and ranking fourth in the World, Indian Railways are now, more than in the past, playing a pivotal part in the economic and social life of the people.

“The Central theme of the Centenary Exhibition is to portray this progress of the Indian Railways and the services they render. The Exhibition is an endeavour to inform the people, who own and patronise the Railways, about how the railways function, of the technical and industrial effort in



Stamp released on centenary

Key to plan shown on next page



KEY TO PLAN		
A	INDIAN RAILWAYS PAVILION	
1	Ministry of Railways	7 36
2	Eastern Railway	8 35
3	Central Railway	9 34
4	Southern Railway	10
5	Chattisgarh Locomotive Works	11
6	Northern Railway	12
7	Western Railway	13
8	North Eastern Railway	14
9	Wheeler's	15
B	BURMAN-SHELL	16 17
1	Asbestos, Magnesite & Ceramic Materials Ltd.	17 20
2	William Jacks & Co.	18
3	J. Sizer & Co. (India) Ltd.	19
4	British Insulated-Cables	20 25
5	Power Sams Accounting Machines (Sales) Ltd.	21 22
6	Vulcan Foundry	23
7	Healy & Graham Ltd.	24
8	English Steel Corpn. Ltd.	25
9	James Finlay & Co. Ltd.	26
10	Vickers Eastern (India) Ltd.	27
11	Asia Electric (India) Ltd.	28
12	Hollerith (India) Ltd.	29
13	Vapadrikken Scandia A/S.	30
14	Mohar Singh Sagarani Singh, (Los Airmen Manufacturing), Societe Anonyme.	31
15	French Associated Manufacturers.	32
16	Volkart Brothers.	33
17	Federal People's Republic of United States Information Service.	34
17-A	United States Information Service.	35
18	BREDA (Khaoshibud Bros.)	36
19	Consolidated Pneumatic Tool Co. Ltd.	37
20	FINSMECCANICA (Societe Finmeccanica.)	38
C	RAILWAY MAP	39
D	OPEN AIR THEATRE "KANCHANJINGA" Station.	40
1	S.K.F. Ball Bearing Co. Ltd.	1
2	Arveco (India) Ltd.	2
3	Sanyosano Metal Industries, Ltd.	3
4	Ministry of Transport (Port Trusts, Light Houses etc.)	4
5	Railbird & Co.	5
6	Sacura (Agrani) Ltd.	6
7	Francis Kinta & Co.	7
8	Austria.	8
9	Hindustan Aircraft Ltd.	9
10	Ministry of Defence—Canteen	10
11	Ministry of Defence—Ordnance Factories.	11
12	Bombay State.	12
E	TATAS	13
1	A. C. C.	14
2	Birla Bros.	15
3	Guest Keen Williams.	16
F	ROLLING STOCK EXHIBITS	17
G	RAILWAY TESTING & RESEARCH.	18
H	PLANNING COMMISSION.	19
1	Martin Barn	20 25
2	Planning Commission.	21 22
I	SCINDIA SWAM NAVIGATION CO.	23
1	Scindia Swam Navigation Co.	24
2	Indian Aluminium Co.	25
3	Mam Mohan Lal & Co.	26
4	B.K. Khanna & Co.	27
J	MINISTRY OF FOOD & AGRICULTURE (PAIN GUR ADVISER).	28
1-2	Ministry of Food & Agriculture (Pain Gur Adviser).	29
3	Five India Dry Accessories Ltd.	30
K	RAWA CROCKERY HOUSE.	31
1	Rawa Crockery House.	32
2	Lata Industries.	33
3	Chowla Bros.	34
4	Bales & Sons Products Association.	35
5	Mahabir Prasad & Sons	36
6	Swashtik Tiji Shilpshala.	37
L	INDIAN MALLEABLE CASTINGS.	38
1	Indian Malleable Castings.	39
2	Melli Industries Ltd.	40
3	J.B. Mangra Rao & Co.	1
4	Madhya Bharat State.	2
5	Ministry of Information & Broadcasting—Publications Division.	3
6	Forest Research Institute & College, Dehra Dun.	4
7	Medical Aid Post.	5
8	Sashy & Farmer.	6
9	Bairavia (India) Ltd.	7
10	Indian Telephone Industries.	8
11	Standard Batteries.	9
12	Ordnance Metal Pressing Works.	10
13	Steel Products Ltd.	11
14	Equipment Machinery Ltd.	12
15	Govt. Central Workshops, Agrinagar.	13
16	Godrej & Boyer.	14
17	Mahad Iron & Steel Works.	15
18	Sata Jain.	16
19	Praga Tools Corporation.	17
20	Match-Work (Electronic), India, Ltd.	18
21	Indian Hume Pipe Co. Ltd.	19
22	Neer Krishna Sadgals Ltd.	20
23	Shourie Bros.	21
24	Sec-Railway Industries.	22
25	Narsing & Co.	23
26	Shalimar Tea Products.	24
27	Ind. Fertilizers & Chemicals Ltd.	25
28	T.J. Cycles of India.	26
29	P.C. Ray & Co.	27
30	Gilanders Arbuztom & Co., Ltd.	28
31	Railtours & Co.	29
32	Healy & Graham Ltd.	30
33	Machins & Spans (India) Ltd.	31
34	The Milling Trading Co.	32
35	Phelps Electrical Co. (India) Ltd.	33
36	Calora (India) Ltd.	34
37	Atlas Cycles Industries Ltd.	35
38	Jay Engineering Works, Ltd.	36
39	Singer Sewing Machine Co.	37
40	Standard Vacuum Oil Co.	38
	The India Electric Works.	39
	*****	40
M	MUSEUMS:	
1	Uppara's Galleries (Behind Pylon)	
2	Eastern & Southern Railway Refreshment & Stalls (Between Bheki H & I).	
3	Kowity for Green (Near "Kanchanjing")	
4	Coca Cola (Near "Kanchanjing").	
5	Other Refreshments in the Amusement Park Area.	

	Enquiry, Bank, Post & Telegraph, Telephones in the Administrative Office.	

the public and private sectors that lie behind the railways undertaking, and the measure of self-sufficiency that has been achieved so far.

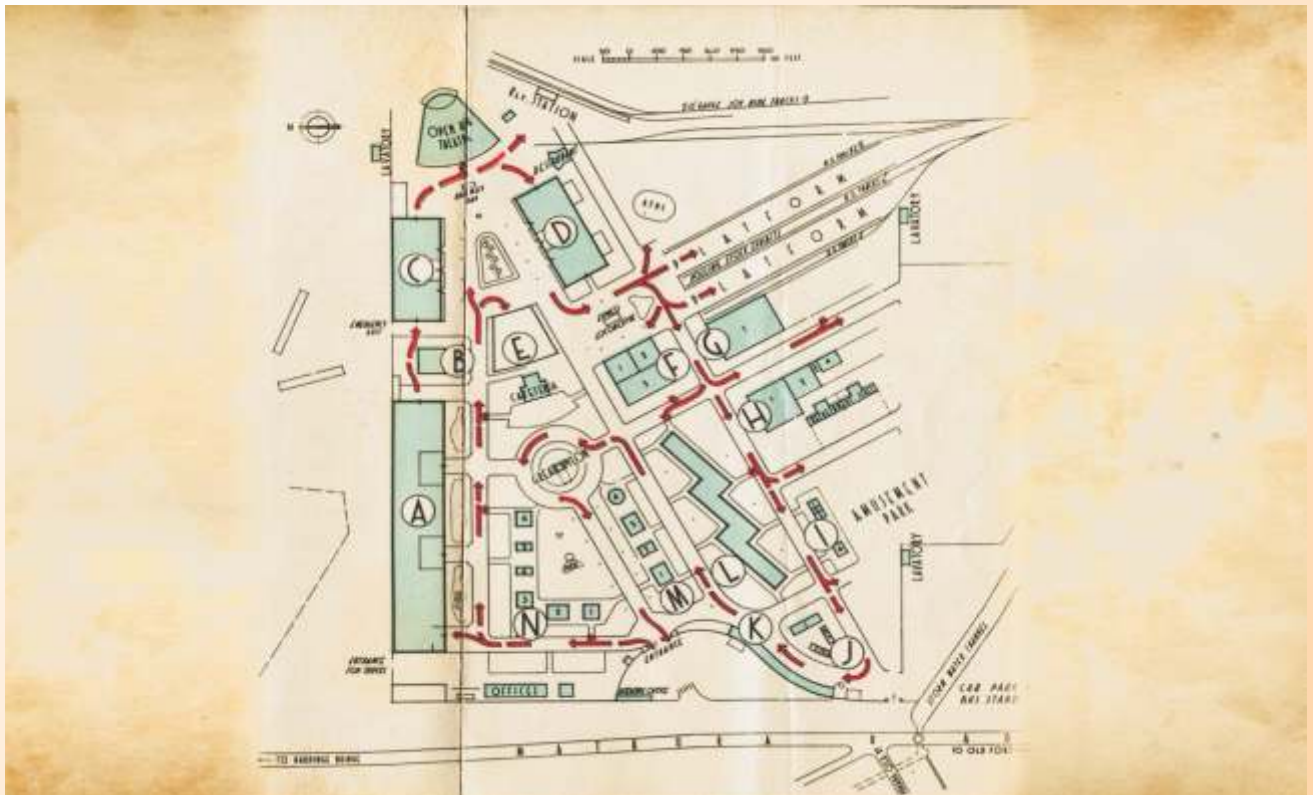
“The story is told in the many pavilions and stands of the Exhibition and by a display of the units of the Rolling-Stock that have been, and are, in use on the Railways. A Museum has also been specially organised showing the many railway components that are still being imported by the Indian Railways so that Indian Manufacturers could study the specialised railway requirements and undertake manufacture within the country.

“The Exhibition has been located at a site on the Mathura Road and railway sidings from Hazrat Nizamuddin Station have been laid for the display of the rolling-stock. Adjoining the Purana Qila, the site itself is of interest. History hovers in the surroundings. Monuments recalling the far and the near past overlook the Exhibition. A fitting back-ground is provided by the passing of the main line trains on the Delhi-Mathura route.”*

A site map of the exhibition and a key to the various stalls

**It is interesting to note that this very site was later christened “Pragati Maidan” and became the centre for large conventions and exhibitions in New Delhi.*

Plan of Centenary Exhibition



that also appeared in the official guide are shown on this and the last page respectively. It should be remembered that it was then only a trifling six years since the nation became independent and had already seen a war over the Northern province of Kashmir. The key reads like a Who's Who of Indian industry and indicates that of all the Ministries and Departments of the Government of India, the railways were perhaps the first to find their feet and lead the way to development.

Of interest to followers of the history of Delhi, is the list of special buses that were run by the Delhi Transport Service from the Exhibition grounds. These would indicate the population centres that were prevalent in Delhi then. Buses (Route Numbers in brackets) ran to the following terminal stations:

Okhla (18), Lajpat Nagar (29), Lodi Road (19), Karol Bagh (24), New Cantonments (3A), Pusa Institute and West Patel Nagar (7), Tis Hazari (10), Hauz Qazi (14), Birla Mills (15A), Tilak Nagar (26A), Malviya Nagar and Vinay Nagar (28A), Delhi Junction station (18, 18A, 29)

Plan of Exhibition and its key extracted from a copy of the Official Guide of the Indian Railways Centenary Exhibition.

*Photo of First Day Cover and stamps:
Courtesy Mohd. Mujibullah*

Arjun Balakrishnan



Living with his parents in the central Indian town of Bhopal, Arjun Balakrishnan is a typical boy from a middle class family. Born on the 27th of November in the first year of the 21st millennium, he is all of 16 years old. Like his peers in Class 12, he is preparing for his Board examinations and for the entrance exams for taking up engineering. However, looking deeper, you will find that he is different: he is a rail enthusiast and happens to be the youngest member of the Rail Enthusiasts' Society. In previous issues, we have interviewed eminent personalities, who are also passionate about the railways. As a complete departure from this, we met Arjun and talked with him, in keeping with our main focus that we must get the next generation to be as passionate about the railway as the older generation was. There may be only one Arjun today but we hope and expect that the breed will expand and thrive. Excerpts from the conversation...

Posing before a Dubs and Co. built FM class steam locomotive at the National Rail Museum, New Delhi

The Rail Enthusiast (RE): How old are you, Arjun, and what are you doing now?

Arjun Balakrishnan (AB): I am 16 years old. Currently I live in Bhopal, where I am studying in Class 12 and preparing for my Board exams as well as JEE.

RE: When and how did you become interested in the railways?

AB: Actually, I don't remember exactly when and how my interest in railways started. Maybe it was when my parents bought me a battery operated train set, complete with tracks and stations. That was when I was 8 years old. Or maybe it is in my genes. My father is interested in Railway timetables. Before the days of internet bookings, he would keep buying Railway timetables and flip through them as a hobby. Whenever anyone had difficulty finding a suitable train connection from anywhere in India, he would always be able to come up with a solution. He even had a Bradshaw, which few people even know about.

RE: When most children your age are enamoured by autos and planes, what made you get interested in the railways?

AB: Yes, I know it is strange. While most kids would be excited if they were flying, I would always want to go by train! Once I became interested in trains, I always wanted to travel by train and that too in all different types of trains. I even prefer the food served in trains.

Even as a treat, instead of going to malls or movies I like to go to Habibganj railway station to watch trains and record videos. Habibganj is a small and uncrowded station so it is easier to photograph and videotape trains. Now the MP government has decided to convert Habibganj into a world class station and I am very excited about it.

RE: What is your parents' reaction to this interest in the railways?

AB: My parents have been very supportive about my interest. I have several books about trains which they ordered from the net for me. We often take trips just because I want to go on a particular train. For example, we travelled from Bhopal to Ujjain only to have a ride in the Double Decker train.

RE: What aspect of the railways interests you the most and why?

AB: I am especially interested in the different kinds of railway locomotives, for example, WCAM3, WAP7 which are electric locomotives and WDP4, WDM2 which are diesel engines. I am also particularly fond of the narrow gauge toy trains. We have been on all three toy trains of India, which are UNESCO World Heritage Sites – Kalka-Shimla, Darjeeling Himalayan and the Nilgiri Mountain Railways. The beauty of the mountains, the steam engines (NMR has a steam engine till Conoor) and the different

technologies like the rack and pinion system of NMR fascinate me. I also found the Zig-Zag system of the Darjeeling Railway interesting.

Besides Indian Railways, I have also been on Virgin Trains in England and the London tube. In Singapore, I found the MRT a very convenient and efficient way to travel all over the country.

RE: To nurture this interest you have, what steps have you taken or what have you done?

AB: I maintain a scrap book on trains, especially the Indian Railways. I have a collection of videos of trains which I have downloaded from the Internet. I also have my own train videos which I want to post on YouTube. But everything is on a backseat now because of my studies. When I learnt about the Rail Enthusiasts' Society, I became a member right away. I intend to take part in as many of the Society's activities as I can once my 12th Board exams are behind me.

RE: How do you plan to develop this interest further?

AB: Because of my interest in the railways, I want to turn it into a career. I plan to do Computer Science Engineering. After that I would like to design new railway locomotives.

It is my dream to go to the Rocky Mountain Railway in Canada one day as well the Euro train from France to England. I also dream about going on the Palace on Wheels in India, but since it is so expensive, my parents and myself have decided that we will take a trip on it once I start earning on my own. Then each of us will pay for our own tickets – that is, my parents and myself. I have no siblings.

With a B-class Darjeeling Himalayan Railway locomotive



Arjun with NMR steam locomotive in the background, also at the National Rail Museum

RE: Any stories or anecdotes with respect to the railways you would like to share with us?

AB: When I was 12 years old, and we were living in Pondicherry, we planned a trip to Ooty by the Nilgiri Mountain Railway. But at the last minute my father had to drop out due to some work. Instead of cancelling the trip, my mother, knowing of my interest and how keen I was, took me alone to Ooty although she was nervous about travelling and staying in a hotel alone with me. She couldn't sleep properly the night before but she never told me about her fears till much later. Ultimately, we had a very good journey on the NMR.

I read whatever I can about the railways. For example, I used to read the speech of the Railway Minister while presenting the Railway Budget very keenly. I was particularly interested in the new trains that were announced as I could then plan if any train was worth travelling on. I also read of other schemes and plans that the railways had. A pity that the Railway Budget has now been merged with the general budget so that I will not have the pleasure of reading the Minister's speech.

RE: Do you know any other rail enthusiasts with whom you have interacted? Tell us about these interactions?

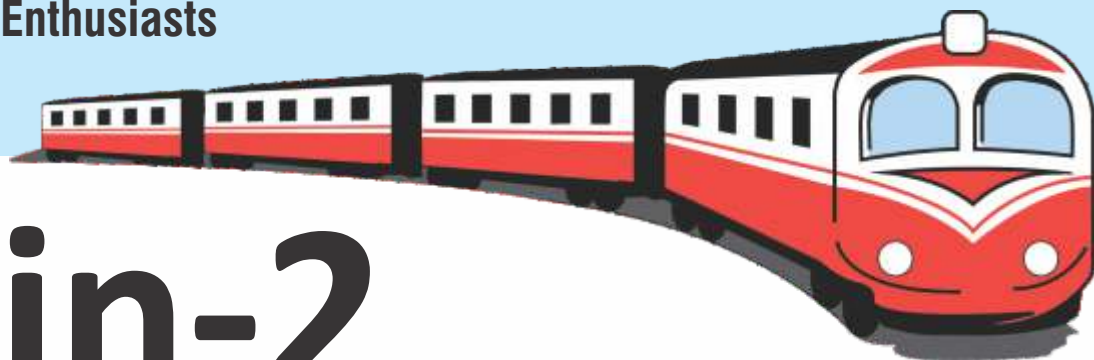
AB: I do not know any rail enthusiast but I was fortunate enough to meet Mr. Nitin Chowdhury who is an Executive Director in the Ministry of Railways. I have spent wonderful hours with him, listening to his experiences and anecdotes about life in the Indian Railways. As a member of your society, I expect to meet many more.

(Editor: Nitin is a Life member of the Rail Enthusiasts' Society and was the one who introduced Arjun to the Society. We would like to re-iterate that rates for membership of the society, except Life membership, are 50% of the normal rates for all students, school or college)

RE: Do you plan to make the railways your career?

AB: Yes. I would like to design more efficient railway locomotives.

For Our Budding Enthusiasts

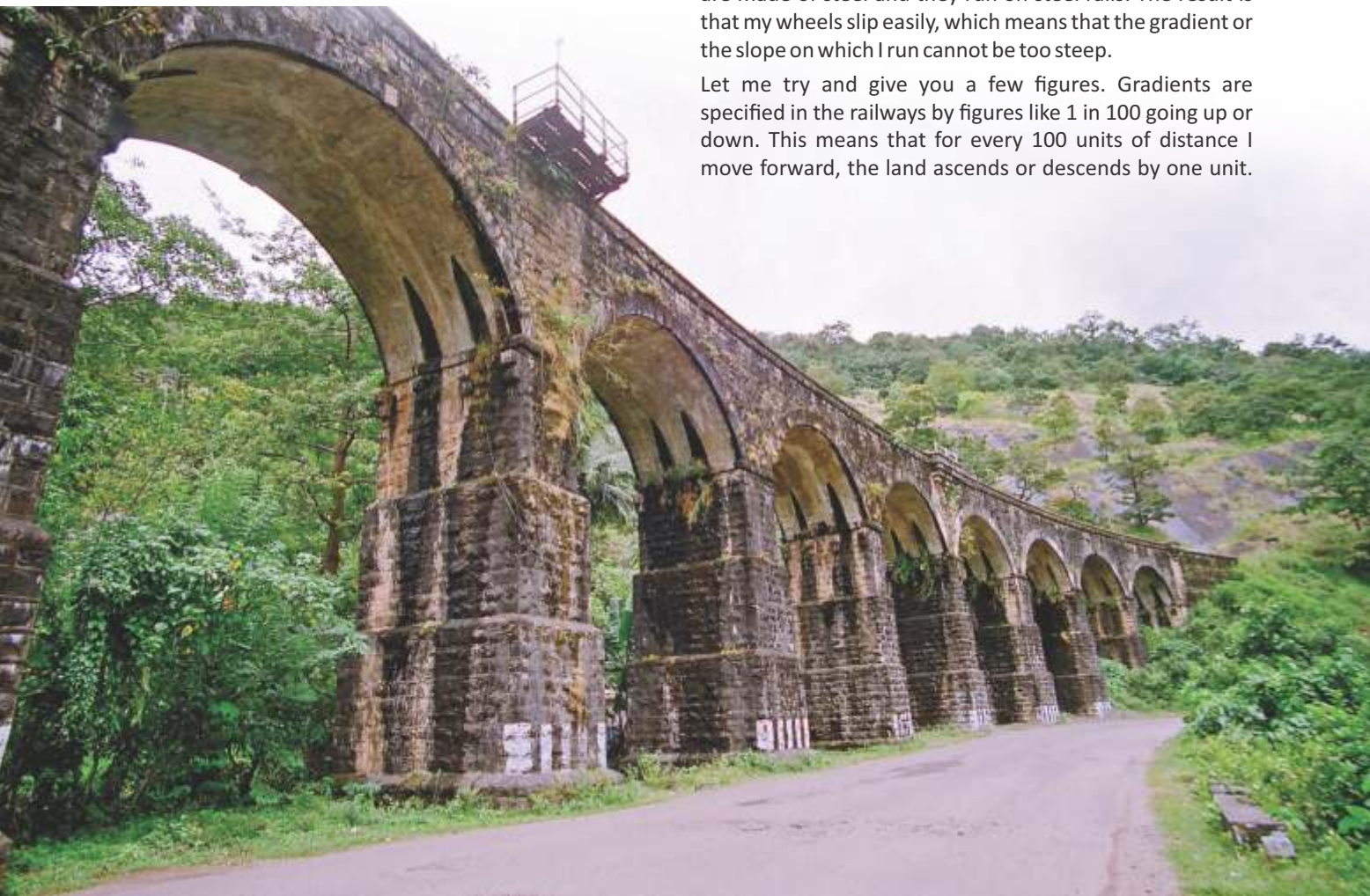


The Train-2

Bridges & Viaducts

This is the second write-up in our series: "The Train". Written in the first person, the train tells you about what it takes to run it – the infrastructure, the rolling stock, other inputs, operational requirements, staff, etc. In the first of the series, the train told you of rail track, as it is the rail track that makes the railway a railway. In the following paragraphs, it tells you of the need for bridges and viaducts and covers some of the major bridges that we have in India.

An arch viaduct on the Tenkasi-Quilon section in Southern India



I am sure all of you know what a bridge is, but may not be too sure what a viaduct means. Briefly, a viaduct is a long bridge-like structure carrying a road or railway across a valley or other low ground. Today, I am going to tell you about both, bridges and viaducts, that are built for me to cross rivers and other expanses of water, to negotiate valleys and handle undulations in the terrain.

Why do we need bridges or viaducts? Unfortunately, the land is seldom unobstructed, level or straight. It goes up and down, it undulates, it is criss-crossed by streams and rivers as well as shallow or deep valleys. Unlike a road vehicle, that run on rubber tyres in most cases, my wheels are made of steel and they run on steel rails. The result is that my wheels slip easily, which means that the gradient or the slope on which I run cannot be too steep.

Let me try and give you a few figures. Gradients are specified in the railways by figures like 1 in 100 going up or down. This means that for every 100 units of distance I move forward, the land ascends or descends by one unit.

This can also be expressed as a percentage as well. For instance, 1 in 100 grade is a 1% grade. Similarly, 1 in 40 is 2.5%. Most railway lines in India do not have a grade steeper than 1 in 100. In fact, in the plains, grades are normally 1 in 200 or even flatter. It is only in the mountain railways that there are steeper grades. But that will be a separate story I'll tell you later when I will talk of negotiating grades steeper than even 1 in 15.

Thus, the track that I run on has to be more or less flat most of the time. Roads tend to follow the contours of the land they are on. Rail track cannot do that indiscriminately, so that whenever there is a depression in the land or a river valley, there is need to build a viaduct or a bridge. Bridges are normally built across rivers or arms of the sea; viaducts tend to cross valleys and low lying areas where there may or may not be a river.



Bhogibeel Bridge - Work in progress on the piers



Bhogibeel bridge with girders

Consequently, rail bridges and viaducts are as old as the railway itself. Obviously, there are all kinds, types and sizes of bridges. They could be only a few meters long or stretch for many kilometres. They could pass over the open sea or a mere slow flowing rivulet. Let us look at some of the types of bridges that I ply over in our country.

The oldest bridges that were built were arch bridges. These are based on the principle that an arch is a very stable structure. The span in Mumbai over which the first train ran in our country, the Dhapoorie viaduct, was an arch bridge. The arch bridge design reached its pinnacle on the Kalka-Shimla Narrow Gauge section where you can see a 4-tiered arch bridge, reminiscent of similar bridges built by the ancient Romans as aqueducts.

The screw pile bridge was another type of bridge the early

engineers adopted particularly while bridging estuaries and backwaters where the current was not too severe. On the erstwhile Bombay Baroda and Central India Railway, it was this type of bridge that predominated between Bombay (now Mumbai) and Ahmedabad, including the Vasai creek, Mahi, Tapti and Narbada rivers. The bridge piers comprised of two or more cast iron piles that were screwed down to an appropriate depth where hard clay was found. While these bridges served the purpose at the time they were built, they had a short life and other limitations. The Indian Railways as a policy decided in 2001 to replace all such bridges.

The evolution of the well foundation adopted and pioneered by the early railway bridge designers and builders has been a major contribution to large bridge construction in the country. In view of the difficult subsoil



Vallarpadam Bridge at Kochi, currently the longest bridge in India

conditions of the foundation bed, open foundations could not be applied in India in most cases. The advantages of the well foundation were quickly realized. This design was indigenous to India and had been adopted in early bridge and building construction apart from the construction of ordinary wells for drawing water. The well foundation involved the sinking of cylinders or wells of brickwork to considerable depths through the sand until clay or rock was reached. Piers were built over foundations of a single well or a cluster of wells. In many cases, even in the early years, the wells were strengthened with iron work consisting of both vertical and horizontal members. Once the wells were founded they were usually filled with sand and capped. The well foundation over time has become the most popular method of founding bridges in India.

You would have noted that in the case of the screw pile bridge and the well foundation bridge, you built piers, on which you had a superstructure. The latter normally consisted of iron or steel girders. As you travel on me through the country, you will come across various types and shape of girders. However, post Independence, particularly in the last three decades, there has been much greater use

of pre-stressed concrete (PSC) slab girders and many of the new bridges built over major rivers either as replacement of earlier bridges or new bridges have been with PSC slab girders. The longest bridge in India today is the Vallarpadam Bridge in Kochi, which has 236 PSC girders, 198 of which are 40 metre long. The launching of girders, whether steel or PSC slabs, is a very exacting exercise and several alternative methodologies are adopted depending upon size of span, site conditions and accessibility of the site. These include use of cranes or derricks, end launching including the cantilever method, side slewing, use of trestles or with the help of a launching nose.

Many of the rivers, particularly in Northern and Eastern India, are known to frequently change their course. Therefore, integral to the construction and maintenance of bridges is the need to ensure that the river flows in a well-defined channel and does not meander. For this, bridge



Multi-tiered arch bridge on the Kalka-Shimla Railway

Bridge across the Yamuna at Agra. This bridge is in view of the Taj Mahal





Artist's impression of the bridge across the Chenab. When ready, this will be the highest bridge of its type in the world



Pamban bridge - open to ship movement

engineers resort to the construction of bunds or walls to guide the water. These guide bunds can be a major construction as in the case of the bridge being built across the Brahmaputra at Bhogibeel near Dibrugarh in Upper Assam. The bunds built on the North and South bank are 2 kms. and 2.7 kms. long respectively, apart from about 16 kms. long dykes on each bank. When completed in 2018, this will be the longest rail bridge in India with a length of 5.4 kms. Another feature of this bridge is that it is using welded steel girders with no rivets, the first of its kind in the Indian Railways. Like most other major rail bridges, this is going to be a rail-cum-road bridge.

Railway Bridges are some of the 'Mega Structures' that have been created by railway engineers over the last hundred

and sixty years. Many of these bridges are now over 100 years old and some need to be replaced. Across the Hooghly at Kolkata, the East Indian Railway built two noteworthy bridges known as the Jubilee (1887) and Wellington (Vivekanada) (1932) Bridges. In the last issue of the magazine, there was an article about the condemnation of the Jubilee Bridge and the building of a new bridge, the *Sampreeti Setu*, in its place. Another remarkable bridge is the Pamban bridge which takes trains from the mainland to Rameswaram island in Southern India. This bridge, built in 1914, has a span that opens to allow ships to pass. Originally built for Meter Gauge, it was converted to Broad Gauge in the 1960s. Now under construction on the line from Jammu to Srinagar across the Chenab, is an amazing Steel arch bridge. When completed, this will be the tallest such bridge in the world with a height of 359 meters from the river bed level to the centre of the arch.

By the time the British left India, the rail network had reached almost every corner of the nation. The notable exceptions were the West coast and a link to the Kashmir Valley. The primary reason for this was the difficulty in building the large number of bridges and viaducts (and also tunnels) that would be required in both these regions. The Konkan line with about 2000 bridges has taken care of the West coast, while the link to the Kashmir Valley with over 750 bridges will be completed shortly after the bridge across the Chenab is ready.

When I meet you again in the next issue of the magazine, I will tell you about tunnels.

Photos: Archives of the Rail Enthusiasts' Society

News & Events

Visit to Metro tunnel under the Hooghly

India's great tryst in revolutionising urban transport began with the country's first metro line becoming operational at Kolkata (then Calcutta) on 24th October 1984. After 33 long years, the City of Joy is pioneering another engineering feat: boring the nation's first underwater tunnel below the Hooghly River, thereby linking the twin cities of Howrah and Kolkata by mass rapid transport for the first time.

When completed, the East-West Metro project, as it is commonly known to Kolkatans, will connect Howrah Maidan to the West of the river to Bidhannagar, also called Salt Lake City, in the Eastern part of Kolkata. With a route length of 16.55 kms., it comprises of 10.81 kms. of underground lines and 5.74 kms. of elevated alignment. The first part of the project is expected to be commissioned by 2018.

On 3rd April 2017, members of the Rail Enthusiasts' Society had the pleasure of visiting the tunnel construction area, 30 metres below the surface, where more than 400 engineers and technicians of KMRCL and their partners, are toiling day and night to bore under the mighty river. The group witnessed the boring operations which are being done by means of sophisticated Tunnel Boring Machines (TBMs).

The Chief Engineer of the project, explained that the greatest challenge of this endeavour was to design the alignment and execute the tunnelling activity through the alluvial soil of the area, under a densely built up locality which houses several heritage structures over a century old. Inserting the TBMs underground required deft planning and coordination especially in view of environmental



Inside the tunnel

concerns. On the day of the visit, a kilometre of tunnel boring had already been completed from the Howrah Maidan end. The TBMs had been successfully progressing at their rated capacity of 7 metres daily. The underground Metro Station is being built between the old and the new railway terminals at Howrah.

After the underground visit, KMRCL officials took the visitors to see the tunnel segment casting yard of the project, where skilled artisans, with the help of high precision machines, were busy manufacturing the concrete segmental liners which are used to retain the walls of the tunnels.

This visit not only gave members of the Rail Enthusiasts' Society an awe-inspiring experience of witnessing tunnel excavation work but also made them realise the immense dangers and hazards the workers have to face each day while working in such inhospitable locations underground. The day is eagerly awaited when the two underwater Metro tunnels finally link Kolkata to its sister city Howrah.

Debate on Preservation of Railway Heritage

18th April 2017 was celebrated as World Heritage Day. The Kolkata chapter of the Rail Enthusiasts' Society took the lead and under the auspices of Eastern Railway celebrated the day by organising a debate involving reputed schools of Kolkata and Howrah. The venue was the Regional Rail Museum at Howrah. The debaters deliberated on the subject: Preservation of Railway Heritage matters for the future of Railways in India.

Mr. Vinoo Mathur, President, Rail Enthusiasts' Society, was one of the judges. Other judges were Justice Soumitra Pal, retired Judge of the Kolkata High Court and Dr. Sudakshina

Kundu Mookerjee, retired Professor, West Bengal University of Technology, both members of the Rail Enthusiasts' Society. The General Manager of Eastern Railway was the Chief Guest.

The Regional Rail Museum at Howrah, among the first of its kind in India, was set up on the banks of the river Hooghly on 7th April, 2006. The museum highlights the long history and rich heritage of the railways in the eastern part of the country, particularly of the Eastern Railway zone (erstwhile East Indian Railway), along with the iconic Howrah Railway Station.

HUMOUR ON RAILS



The senior railway manager was in the middle of his siesta on a warm Sunday afternoon when the door bell rang. While in the process of unlocking the entrance door, he could hear his pet dog on leash in the front veranda barking at the person who had rung the door bell. The latter, a person from the Control Room, was trying to quieten the canine.

"Please, you need not bark," he said, "Your boss keeps barking at us the whole week."

The same senior manager was on a tour of his area. While on such tours, the managers travel in inspection carriages that are more or less homes on wheels, with sitting room, bedroom, etc. They serve the purpose of hotels on wheels, especially when wayside stations and other rail facilities are visited and inspected in remote areas far from the larger population centres and sometimes lacking road connectivity. These carriages are normally attached to freight trains or unimportant passenger trains so that the expresses and more important trains are not disturbed.

During the tour referred to, the manager's inspection carriage was being shunted from one train to another in the middle of the night. During such movement, jolts are inevitable, and woke up the manager. He got out of bed and decided to urge the staff doing the shunting to be careful, avoid rough shunting and not jolt the carriage so much. As he neared the door of his carriage, he heard one of the shunting staff members admonish the others,

"Slowly! Slowly!

The @#\$\$@& is sleeping!"



STOP PRESS

Iron horse lovers

There's something about the sound of a train that's very romantic and nostalgic and hopeful.

Paul Simon

A group of people from different walks of life have come together to share the thoughts of the American singer. The love of the iron horse binds them together. Small wonder, if a newcomer dropping in at their gatherings will be drowned in a plethora of technical terms, he will be at the same time be pleasantly surprised as memories of pleasant train journeys are refreshed. But the get together of these train lovers have not merely culminated in walking down

memory lane. In a show

of remarkable energy

and enterprise, they

have brought out a

magazine-The Rail

Enthusiast. The

name speaks for

itself. Editor J.L. Singh

and his team deserve

congratulations for

their imagination and

planning of the glossy

magazine which one will not hesi-

tate to place before a coffee-table tome. The Tunnel, a story by Ruskin Bond who needs no introduction is the narrative of a boy's love of trains and tunnels. The introduction of a series of what it takes to run a train will usher in the uninitiated to the toil and trouble the railwaymen have to go through to carry the passengers to safety. The railway enthusiasts swear by heritage. Thanks to their efforts, two girders of the iconic 130-year Jubilee Bridge between Bandel junction and Naihati station will make its way to a museum to be displayed as parts of an engineering marvel. It was destined to be dismantled and disposed off as scraps. The contributors have journeyed beyond the hot and dusty Indian plains to train journeys in Pfestinlog, Welsch Highland Railway and Brienz Rothorn Railway in the Swiss Alps. Carry on then.



The Statesman

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RAIL ENTHUSIASTS' SOCIETY

(Registration No: S-E/792/Distt. South East/2015)

The Rail Enthusiasts' Society, incorporated on the 28th of December 2015, aims to provide a platform for rail enthusiasts to disseminate knowledge, air their views and exchange ideas regarding the railways in India or overseas. Its first activity was to publish a magazine whose 4th issue you have in your hands. Other activities have been added and more will be started in due course. Apart from issue of the magazine, we have organised one enthusiasts' trip on the Dabhoi-Miyagam Narrow Gauge section, a visit to the Kolkata Metro construction tunnel under the River Hooghly and a debate among school children at Kolkata on the need for preserving rail heritage. On the next page, you will find details of how you can become a member of the society. In case you are interested only in the magazine, the subscription rates are as follows:

Single copy ₹ 100.00

Annual subscription (4 copies) ₹ 360.00

5-year subscription (20 copies) ₹ 1600.00

Note:

1. The rate for the E-copy has not been worked out yet but would be less than that for the hard copy.
2. For overseas subscribers wanting a hard copy of the magazine, the rate charged will be as follows (to cover packaging and postage):

- | | |
|-------------------------------|-------------------|
| a. Single copy | USD 8.00 |
| b. Annual subscription | USD 28.80 |
| c. 5-year subscription | USD 128.00 |

3. For countries that do not deal in the US Dollar, please email a request to the Secretary of the society and we shall give you the rate in other currencies like the Euro or GBP.
4. The subscription rates for membership of the society for those residing in India include free delivery of the magazine as well. For members residing overseas, and wanting a hard copy, please email the Secretary and special rates will be fixed in each case to cover the cost of postage. Overseas members will get an e-copy free.
5. Libraries will be given an additional 5% discount over rates for subscription to the magazine.
6. Bonafide students' rates for membership, valid as long as they remain students, will be 50% of the normal rates. Such rates would not apply to Life membership.
7. For subscription to the magazine, please mail the completed form below to: The Editor, Rail Enthusiasts' Society, C-494, Defence Colony, New Delhi-110024 (India). A scanned copy can be sent by e-mail to railenthusiast2015@gmail.com

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RAIL ENTHUSIASTS' SOCIETY

(Registration No: S-E/792/Distt. South East/2015)

Membership of the Society

Membership of the society is open to individuals as well as Corporates. While individuals have the choice of three types of membership, for Corporates we have only membership for life.

Corporate Membership

This entails a one-time payment of ₹ 200,000/-. Membership gives the following to the Corporate:

- Five copies of all magazines or supplements to the magazine that are published
- Concessional rates for any item such as artifacts, books or memorabilia on sale
- Invitation to 5 members of the organisation nominated by the corporation for any event or activity the society may organise
- Other benefits will be added in due course as and when more activities are added

Rate for Corporate membership for foreign organisations will be US Dollars 4,000/-.

Individual Membership

For individuals, we have 3 types of membership. The member gets all copies of the magazine and its supplements, if any, as and when they are published. Concessions for other activities will be announced as and when the other activities are introduced.

- Associate member : This gives you membership for one year. Subscription: ₹ 500/-
- Ordinary member : This gives you membership for five years. Subscription: ₹ 2000/-
- Life membership : This gives you membership for life with a one-time payment: ₹ 10,000/-

For foreign nationals and overseas members, rates are as follows:

- Associate member : Subscription: USD 10/-
- Ordinary member : Subscription: USD 40/-
- Life membership : One-time payment: USD 200/-

Please see the note on the previous page for overseas members wanting hard copies of the magazine.

Mode of Payment

Payment is acceptable by cheque, demand draft or cash. You can also do a direct bank transfer. All cheques and demand drafts should be payable to "Rail Enthusiasts' Society". For direct transfer to our bank, details are as follows:

- Name of bank : State Bank of India
- Branch : Personal Banking Branch, New Delhi
- Address of the bank : E-4, Defence Colony, New Delhi-110024 (India)
- Type of Account : Current
- Account Number : 65250409615
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- MICR Code : 110002751
- Swift Code : SBININBBFXD

For enrolling as a corporate or individual member, all you need to do is send an email or a letter to the Secretary of the society. The address is: C-494, Defence Colony, New Delhi-110024 (India), while the email id is railenthusiast2015@gmail.com.

Visit our website : www.railenthusiastindia.org.in

The compound Mallet steam locomotive was developed by inventor Anatole Mallet to improve the efficiency and the total power of the locomotive. The locomotive had a 2-6-6-2 wheel arrangement and 4 steam cylinders. Two of these cylinders used High pressure steam, while the other two used low pressure steam that was the exhaust steam from the High pressure cylinders.



The 1926-built locomotive shown on this page is part of the Northwest Railway Museum at Snoqualmie in the State of Washington in the USA. It was built by the Baldwin Locomotive Company, Philadelphia, USA. Originally built in 1926 with side tanks for water, later in 1940, it was converted to a tender locomotive by the then owner, Weyerhaeuser.



