RAIL CANVAZ

A TrainTrackers' Initiative

June 2025

GLORIOUS

100

YEARS OF

ELECTRIFICATION

(1925-2025)

INDIAN RAILWAYS

A CENTURY ILLUMINATED

A Centennial Chronicle of Indian Railway Electrification

EDITOR'S DESK

Railways had come to India a pretty 150 years ago. Back then, steam power acted as the prime mover mobilizing people and commodities alike. A few decades later, electrification came calling as clear skies began to give way to caged horizons, albeit rather slowly. But who would have imagined that the next hundred years would witness the skies being completely knit with charged wires along the tracks.

Electrification, although made its debut before the diesels, yet it could not quite spread its wings like an eagle ruling the high skies. Though it took the nation by storm during its advent, but its proliferation remained confined within certain pockets of the country, especially the areas catering to suburban services. Even, not quite a long ago, Indian Railways (IR) was defined by the fumes of burnt coal from the steams which in course of time got replaced by the 'holy smoke' from the diesel driven machines. But who in this ever-changing world can stop prolonging the inevitable!

The electrified network has grown in multifaceted dimensions during its ten decades of existence in the country. Reputed and distinguished players across the continents have had their key roles in determining the path of progress for the electric traction here, though the indigenous technologies have ruled the roost for better part of the 'Electric Era'. If it were the initial DC electrics imported by British India made by Swiss Locomotive and Machine Works, Vulcan Foundry and English Electric or the pioneer of AC traction by Japanese consortium made up of Toshiba, Hitachi and Mitsubishi or European 50 cycles group in the initial days, then its upto Alstom and Siemens now. Nevertheless, the Chittaranjan Locomotive Works (CLW) has been the torch bearer which had kept things going for all these years. But it must be admitted that the change of platform from single phase electric machines to 3-Phase ones proved to be the game changer in the Indian market with Adtranz or ABB turning things around.

Electric Traction has witnessed multiple transitory phases here – from 1.5 kV DC system to 25 kV 50 Hz AC traction, from DC EMU sheds to dedicated AC EMU sheds– electrification in India has traversed a unique path that includes production of two sets of locomotives and EMUs, along with the hybrid ones later, for supporting both cycles. But the most incredible development that catapulted the electric traction to higher heights was the energizing of the Meter Gauge (MG) Network down south, thereby facilitating production of MG Electric warhorses as well. As electrification peaked, over reliance on fossil fuels began to be done away with. This implied markedly reducing diesel consumptions for lower carbon emissions to meet the nation's objective of **Energy Independence** by **2047** and **Net-Zero Goals** by **2070.** This led to a paradigm shift in policies that converted the Diesel Locomotive Works and Diesel Modernisation Works into Benaras Locomotive Works and Patiala Locomotive Works respectively – not a mere change of names but a complete change in their production activities which now includes assembling and turning out of electric locomotives only instead of their diesel counterparts, except for private orders. Such an incredible transformation of electrification through multiple transitional phases in our nation is truly charted and reflected in our Cover Story – A *Century Illuminated.*

This sudden quantum leap in stratagem came as a clear message to relegate diesels to inferior services, mostly. Now, with the diesel warriors being 'rested' to rust, the path of electrification became smoother than ever but its principal source continued to be another form of fossil fuel whose extensive use also came under the scanner. Thus, priorities changed overnight which necessitated a change in approach. Focus shifted on the renewable energy to feed the grids as the **National Green Hydrogen Mission** and **Nuclear Energy Mission** has come knocking on the doors. But how far our country is ready to depend on these alternative sources of energy? Have we reached a state where we can completely afford to rely on these sources? A discourse *'Verdant Rails – The True Hue of Indian Railways' Green Energy'* on figuring out the answers to some of these critical questions is tendered for the inquisitive minds.

Keeping up with the Centenary Year of Railway Electrification in India, the Railway Board had issued directives to the sheds holding Electric Locomotives for commemorating the marquee occasion. Accordingly, many holders came up with numerous unique ideas apart from putting up the '100 Years of Electric Traction' stickers on the rolling stocks. Some sheds turned up with striking liveries while some others christened some of their locomotives. For most of these initiatives, regional ferroequinologists worked in tandem with the Zonal or Shed authorities for some outstanding and remarkable results which can be traced through our article *A Centennial*

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Ode in Colour and Current drafted by the rail aficionados involved with the projects across the country.

While most of the Electric Locomotive Sheds celebrated the occasion with some exceptional oeuvre on their rolling stocks, Central Railway (CR), from where it all started, did nothing of significance in this aspect. It is inscrutable that except for hosting a commemorative celebratory event at the CSMT Mumbai, CR has been found completely wanting in this arena, especially, when the country expected some of the best initiatives from them. Alas, nothing happened of sorts. Instead, CR chose to get mired in a controversy surrounding the brief diesel runs of its prestigious 'Deccan Queen' due to shortage of the electric runners with them. This short-lived dieselized run prompted media to make news about this 'unholy enactment' describing the chapter as a Dark Phase in the history of nation's first electric train irrespective of near zero delay in the services during the period. Under the impact of such media reports, CR obliged by reverting the link back to its original traction prompting some localized rail appreciators, who self-proclaimed themselves as 'Railway Experts', to go berserk. Unfortunately, those 'Railway Experts' never came up with their expertise and innovations to persuade CR to come out with something wonderful marking the occasion! Unfortunately, CR managed to find itself amidst this totally uncalled controversy and hogged all the limelight for all the wrong reasons.

Talking of celebrations, the world didn't end with observing the Centenary Year of Electric Traction only. A couple of celebrations involving the 48thAnniversary Celebrations of the National Rail Museum (NRM) and the World Heritage Day by the Indian Railways are also noteworthy, although under publicized. Both functions happened along the same vein in the form of firing up of heritage Steam Locomotives. To enlighten our readers with intricate details of these two spectacular events, we have two articles – *Steam Echoes at the National Rail Museum* by **Anmol Ezra Shah** and *ASHWANI – Veiled in Vapour*. We conclude our celebration chapter with *Steel Turns 55 – A Legacy Forged in Motion* by **Somanko Tiru**.

This issue has more to it apart from these celebrations. Let our authors make you jog into the past with their exceptional offerings in *Jalandhar Revisited* by **Jakob Stilling** dealing with the bygone Steam Era of Punjab, *Kolkata EMUs – Trivia & Oddities* by **Anamitra Ghatak** about the historical aspects of the multiple units, *Lest We Forget – The GM Warriors* by **JL Singh** on the earliest GM machines that treaded the IR tracks and *The First 'Make in India' EMU Rake* by **trAnspOrt hObO**.

Forging ahead, subjects of diverse nature has been our forte and our readers will love to go through *A Station Unlike Others* by **Shourya Basu**, *Bridging Legacies – The Renaissance of Pamban* by **Anamitra Bose** and *The Radiant Roar – Celebrating Cab Craftsmanship* by **Anamitra Bose and Sripad Ullas** for a change in literary palettes.

To conclude things, we have a unique article from **Vivek Bhusan Sood** – the DRM of Sonpur Division under the East Central Railway which tells us about the *Rail Mela at Sonpur*, a sui generis fair with railways taking active part.

Last but not least, we pay our tribute to those who had lost their lives in the heinous terror attacks in Pahalgam in Kashmir, we bow our heads to those soldiers and citizens who lost their lives in the war that followed. May their souls rest in peace. We salute the **Indian Army**, the **Indian Air Force** and **the Indian Navy** for giving a reality check to the terror outfits & the countries supporting them. We hail the **Indian Railways** for playing a key role in overpowering the anti-national forces during these challenging times.

Jai Hind.

Somsubhra Das

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inside stories

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inside stories

Technical Insight

Features

Photo Story

Miscellaneous

Its Time to Act Now

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Write to WB Govt. to revive this most eco-friendly mode of public transport

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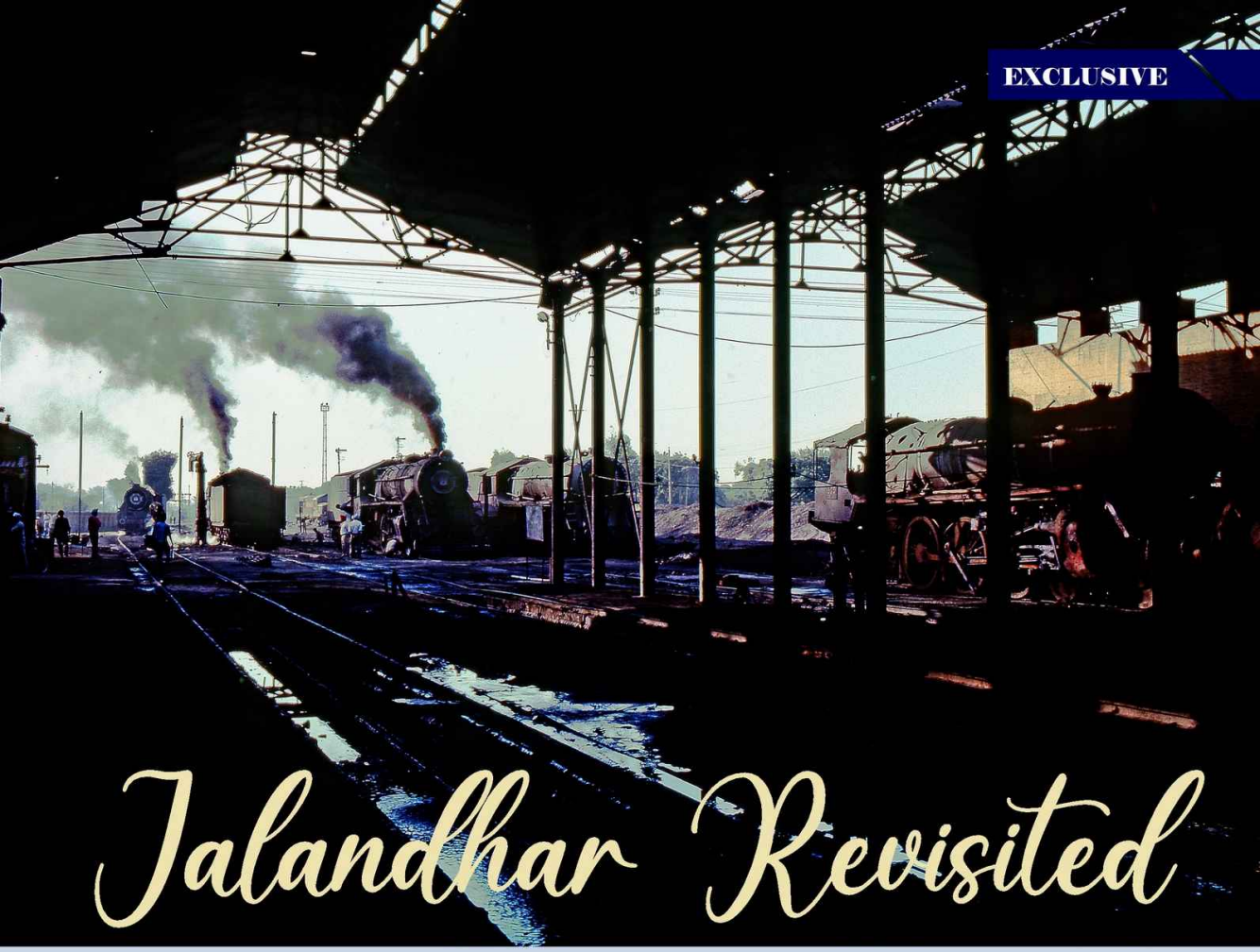
Calcutta Tram Users' Association

EXCLUSIVE



Jalandhar Revisited

WLs in Punjab, November 1994 – The Very Last…

Jakob Stilling

A Danish lawyer born in 1961, he became a volunteer steam train guard in 1984 and began photographing trains in 1974. He has traveled extensively across Europe, Asia, and parts of Africa and the Americas in search of steam locomotives. His railway journeys include multiple visits to East Germany, Poland, and the Indian subcontinent—starting with Northern India in 1993 and further trips to Pakistan in 1994–95. Since 2017, he has toured India again with his wife, visiting iconic narrow-gauge lines like KSR and NMR.

On the 1994 trip to India, we arrived overland from Pakistan after having visited the BESA SGS and SPS sanctuary around Malakwal in the Punjab.

Crossing the border was not without problems. The Pakistanis had closed the border for entry because of worries about a possible eruption of pneumonic plague in Gujarat (which at the end turned out to be fake news, generated by western media). However, entry to India was possible after going through a quick health check on the border. The doctor on duty as part of the Indian control post with his cigarette lit certainly coughed much more than the 3 of us! After clearing customs, we caught a taxi into Amritsar. Our Ind-rail passes were ready for collection at the International Ticket Bureau and with those in hand we had time to pay a visit to the Golden Temple before catching an express for the short distance down to Jalandhar.

On this trip, we were four of us travelling together. Johs, my travel companion from the trip from previous year, had travelled ahead of us via Delhi and had reported that broad gauge steam in Moradadad and Saharanpur was gone, meaning that the only remaining broad gauge steam on Northern Railway was by now the light Pacifics, class WL, running from Firozpur and Jalandhar on the Punjab branch lines. The other piece of bad news that Johs gave us on a phone call the morning we were leaving was that he would not be able to join us in Malakwal, as crossing of the border in Wagah was not possible from the Indian side.

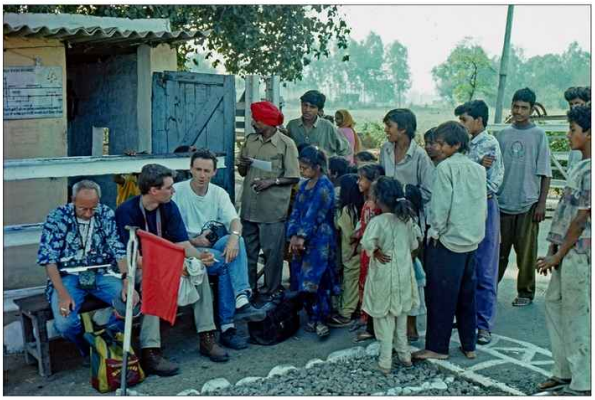
Mr. Singh & his van with the author & his companions

As we arrived in Jalandhar at dusk, we were relieved to see a WL ready to depart for Firozpur. We had no firm arrangements about how to meet with Johs – always a problem in the days before mobile devices. When going by motor rickshaw to our chosen hotel, where we hoped to join Johs, we spotted him waiting for us in front of a café near the station! He had already booked the services of Mr. Singh and his minivan, and we would be ready to roll by dawn the following morning.

The pattern of service was much like the previous year. The stopping trains on the mainline towards Ludhiana were of course no longer steam hauled. East of Jalandhar, the trains running from Jalandhar to the branch from Phagwara towards Jaijon Doaba were still steam hauled, as well as the trains to Hoshiarpur. In the opposite direction, most stopping trains (5 in each direction) between Jalandhar, Lohian Khas and Firozpur were also steam hauled. There were also some trains on the line to Fazilka south of Firozpur that were reportedly still steam hauled.

The following morning, we started out visiting Jalandhar Cantt., which was much quieter than the City station and got our first few shots of the WLs on the mainline, repeating the chase from the 1993 trip (see the May 2023 issue) down the

WL class loco with a passenger going past a level crossing



Local children thronged the foreigners

Grand Trunk Road of train 4JJ towards Phagwara Junction. Most of the day was spent chasing trains on the branch and around a photogenic level crossing in a village on the double track section.

The fertile fields were green and time seemed to be standing still as soon as we left the highway. Pastoral scenes of farmers working the fields, often with bullions, people chatting at the closed level crossing gates while the steam train passed by and cows resting in the shadows abounded. Friendly and curious children lined up wherever we stopped. Unfortunately, we were usually not able to answer their questions as the only communal language was a smile and some gestures. Today these kids must be around 40 years old!

We decided to photograph the arrival of a train in one of the small wayside stations on the branch line east of Phagwara, serving a tiny village called Khatkar Kalan. A narrow and twisting lane went from the main road past small Sikh shrines in the fields down to a small group of trees lining the station house and the single platform. The station environment was untouched by time. The ticket prices as per April 1994 were meticulously painted on the wall by the booking office window, which even stated where to stand in line. A single to Banga, the neighbouring station was two Rupees! On the track side of the building cobblestones in

Meticulously painted Time-table

Khatkar Kalan station scene

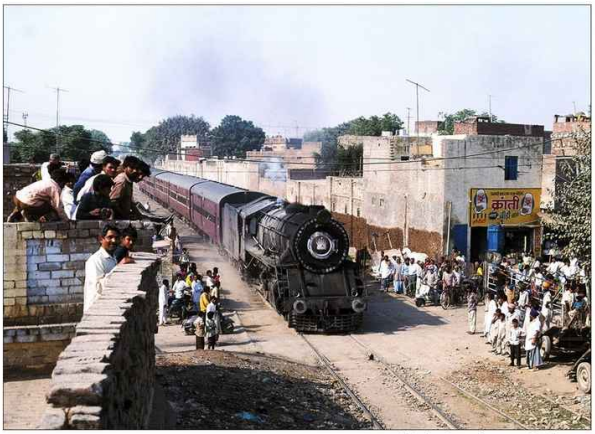
the same level as the sleepers of the single railway line marked the platform edges. As the Jalandhar bound WL hauled train steamed in, nothing really suggested that this was indeed 1994 and not 1948. The train stopped briefly, a few passengers got out and then the guard flagged for departure.

Modern trains were however on their way, a new diesel railcar on crew training ran on the mainline passed us several times that day and the expresses roared past, some of them double headed by WDM2s. The following day we worked our way all the way to Firozpur.

The line to Fazilka to the south strangely left the Cantt. station to the north, running through Firozpur City station and turning south on the western outskirts of the town. We decided to try for an urban spot somewhere between Cantt. Jn. station and City station but found ourselves locked in traffic jam on the circular road, caused by two level crossings near the city station, already closed for the train from Fazilka.

Eager not to miss our photos, we all got out of the minibus and ran through the pile-up of traffic to the level crossing. It would not be possible to get a proper shot from street level, but on the opposite side of the line we could see some people watching the congested street from a roof terrace. That roof would be a marvelous place for a shot. With (maybe) a few minutes to spare we climbed the crossing gates, crossed the line and ran past a few shops on the other side to get to the

Dual WDM2 hauled express



The level crossing scene @ Firozpur

gate of house, into the courtyard and up some stairs to the roof. By now we could hear the exhaust of the train, departing from Firozpur City station. With the inhabitants of the house understandably stunned by the sudden appearance of four photographers we managed to get ourselves sorted into the proper photo position with only seconds to spare. On the picture, hundreds of waiting people by the level crossing are watching us....

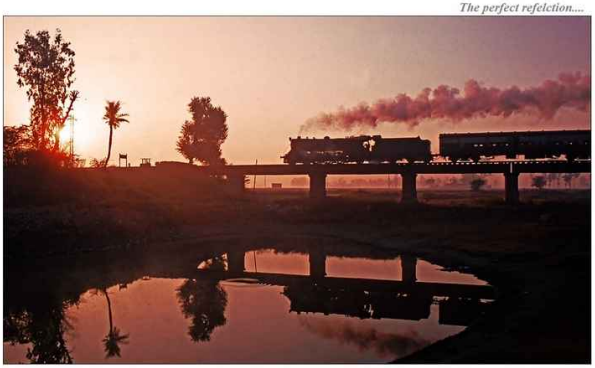
The landscape south of Firozpur was much drier than the green agricultural areas nearer the river and irrigation canals and the midday light did not help. We did however get a few pictures on this line and all trains were steam hauled.

During the last day of our stay in Jalandhar we had some success chasing on the line towards Firozpur. One morning, a sunrise picture of the train reflected in the water while crossing a small lake near Hussainpur was attempted.

As the road runs parallel to the railway line, it was fairly easy to overtake the train to get more than one picture of each train.

In those days, the railway and the road shared a narrow bridge at Gidarpindi over the river Sutlej, west of Lohian Khas, and the crossing gates guarding the confluence of rail and road were of course closed for the approaching train. It was not possible to stand on the bridge for the passage of train. Instead, we opted for a shot including the tents of the

The perfect refelction....




420

A WL class loco approaching with a passenger service

track repair squad.

Firozpur shed was still very much a steam shed. The diesels for the Ludhiana trains were parked in the yard, while the steam engines were stabled outside the shed. Inside, two leaking and sorry spare WLs supplied hot water for the crews. We had no problems entering (which was good, as our permit explicitly stated that no photography was allowed in Firozpur!). A line of decommissioned WLs was being cut up by contractors, and judging by the state of the two spare steam engines on shed a further batch of WL was to be recycled before long.

After three intense days of chasing, we said goodbye to Mr. Singh, who had again supplied high class driving – even on

Cattles taking a break at Nawanshahr Doaba Junction

the morning after Diwali, where I suspect he would have preferred to sleep in. He was certainly fast asleep at the wheel of his minibus when we returned from the sunrise shot!

We left Firozpur on the diesel hauled afternoon express 4630 at 16.20, connecting nicely to our booked night train towards Bareilly. An account of what we saw when travelling onwards from there into Bihar was published in the August 2024 edition of this magazine. Until next time, we bid goodbye....

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A distant travller.....

LEST WE FORGET – THE GM WARRIORS

The Saga of the WDM4s, YDM3s and YDM5s

J L Singh

Mr. J.L. Singh is a veteran of Indian Railways with a distinguished career spanning technical service, academic leadership, and heritage advocacy. He served as Senior Professor at IRIMEE, Jamalpur, where he was instrumental in shaping generations of railway officers. Following his tenure in Indian Railways, he joined RITES Ltd., retiring as Executive Director after contributing significantly to railway consultancy and infrastructure development. A lifelong rail enthusiast, Mr. Singh is also a founding member and current Secretary of the Rail Enthusiasts' Society (RES).

When India embarked on the road of rapid industrialisation in the 1950s, it was obvious that the old work horse, the steam locomotive, would not be able to manage the increase in rail traffic. There were two options available – electric or diesel traction. The country was very short of oil, leading to electrification being the best option. Recall that, at that time, Bombay High oil was not available and we relied only on some oil coming from Digboi in the North East. However, it was also realized that electrification is very capital intensive and the country could just not afford it. The resulting decision taken was that we would electrify our track gradually and in the interim period go in for dieselisation.

This led to the import of the North British-built YDM1 class of locomotive from the UK in 1954 for operation in the Gandhidham-Kandla region. Incidentally, these were the first mainline diesels in the country, albeit on MG. For BG (and MG) at that juncture, the best diesel locomotives were of American origin – General Motors (GM) manufactured or those from the American Locomotive Company (ALCO). The Indian Railways first imported ALCO's WDM1 class of locomotives to work in South Eastern Railway to take care of the heavy coal, mineral and steel traffic in 1957. At the same time, it was also decided to import a limited number of BG as well as MG locos from GM and ALCO and decide which ones we would manufacture in the country.

In the 1950s and 60s, GM was one of the biggest companies in the world. Their turnover, if I recall, was more than India's budget (I may be wrong here; I am only indicating that GM was ruling the world). They were not prepared to transfer technology to India. ALCO on the other hand were ready to do so. India thus went in for the ALCO loco manufacture at what was

North British Locomotive built YDM-1 class locomotive

GM built YDM-3 class locomotive

then the Diesel Locomotive Works (DLW) and is now the Banaras Locomotive Works. In 1964, DLW turned out its first locomotive, bearing road number 18233, and began the manufacture of diesels that remained the work horse of the Indian Railways till the late 1980s, by when there was sufficient electrification to take over from the diesels. The story of the unprecedented success of the WDM2 and the YDM4 classes of locos is very satisfying and fulfilling, but that's a tale for another day.

So let us pause here, lest we forget the GM locos that we had imported in the early 1960s. 72 BG and 55 MG diesel locos were imported. The BG locos were all homed at Mughalsarai (now Pandit Deen Dayal Upadhyay Nagar) and although the station was a part of Eastern Railway zone then, the DLS for the locos was under the control of the Northern Railway. The locos were designated the WDM4 class and were very successful. I am sure most rail fans will recollect that the first Rajdhani in 1969 was hauled by these locos. I still recall nostalgically, the shrill whistling sound of its turbo-supercharger when the loco was hauling a full load.

The MG diesels were of two classes: 30 YDM3 class and 25 YDM5 class of locos. These were first based at Siliguri and in the mid-1960s itself, transferred to DLS at Abu Road on Western Railway. I had the opportunity to work with these locos when I was posted as Divisional Mechanical Engineer (Diesel) at Abu Road from 1974 to 1977. Apart from these 55 locos, Abu Road shed also homed about a 100 ALCOs, so that the total holding was over 150, making this one of the biggest sheds in the country and certainly the largest amongst the MG sheds. This was the only shed that homed GMs and ALCOs together. The BG GM loco shed was only for the GMs and there were no ALCOs there. I am thus in a good position to compare the two types of locos.

The GMs were excellent locos. In the three years that I was at Abu Road, we had no failure or problem of any kind on the diesel engine of these locos. Similarly, the electrical systems also gave no trouble at all. The only issue were the bogies and the undergear. For those not familiar with rail terminologies, I would like to clarify that when I say 'bogie' it refers to the assembly below each rail vehicle that has the wheels and other running gear like the motors. There are normally two bogies per vehicle. 'Bogie' does not mean the entire passenger coach, as referred to by many lay persons.

It so happened that when the Indian Railways sent their specifications for the MG diesel locos, ALCO did not have a ready item to suit our HP and maximum moving dimension requirements. So, they designed a new loco with a 6-cylinder inline diesel engine that met all conditions of the Indian Railways. GM on the other hand were in a quandary. They had a ready good 12-cylinder engine that met the Indian Railways' needs, but the engine was too high and would infringe the maximum moving dimensions when installed on a normal loco underframe. Not wanting to design a new engine (the existing one was very good), they resorted to reducing the size of the wheels of the locos. Thus, while the ALCOs have wheels with a diameter of 965 mm, the GM loco wheel diameter is 865 mm only. All very good, but with the reduced diameter, the traction motors could not be mounted on the axles of the wheels owing to lack of space as they are in the case of the ALCOs. GM, therefore, mounted two traction motors in the middle of the underframe of the locomotive. From there, one motor drove the wheels of the front bogie and the other of the rear bogie. The drive was through a universal shaft to an axle-mounted gear box on the first axle of the bogie. From there another universal shaft took the drive to the second axle and similarly, a third shaft transferred the drive to the third axle. There were thus 3 universal (or cardan) shafts for the drive for each bogie and three axle-mounted gear boxes. This system exhibited extensive weakness, resulting in frequent failures of the universal shafts or gearboxes.

There was another catch here. What I have described above is the arrangement of the YDM5 loco. In the YDM3, only the first and second axles were driven while the third axle of each bogie was only a carrying wheel. Thus, the arrangement was not Co-Co as was the case with the YDM4s, YDM5s and

GM built WDM-4 class locomotive


GM built WDM-4 class locomotive

YDM-3 class locomotive at DLW, Varanasi

even the WDM2s, but 1Bo-Bo1. What this means is that the YDM3 had only 4 driving axles instead of 6. This led to the adhesion of these locos being poor; they were thus restricted only to the South of Abu Road, i.e., mostly towards Saurashtra region which was mostly flat with few steep grades. The ALCOs were used towards the North where grades were higher, such as the Bar-Sendra section of Ajmer Division. Occasionally, the YDM5s were also used towards the North but normally, they worked on the Rajkot and Bhavnagar Divisions of Saurashtra.It is also for this reason that when the Sabarmati shed was opened around 1981, the GMs were all transferred to it and only the ALCOs remained at Abu Road.

It is a pity that in the 1960s, GM were not prepared to transfer technology to India. Later, in the 1990s, when the Indian Railways was once again looking for a new diesel loco, GM was not as successful a corporation as they were in the 1950s and were prepared to transfer technology. This is how the current set of EMD diesel locos were manufactured in India.

But there is no doubt that with their 2-stroke diesel engine technology, the old GM loco was unmatched in its day. I will give only two examples of how the loco design ensured no or minimal failures. For instance, one not too uncommon failure of the ALCOs was the bursting of the high-pressure pipe that carried the diesel fuel from the fuel injection pump to the fuel injector. The GMs solved this problem by having a unit where the fuel injection pump and the fuel injector were in one body and there was no need for a high-pressure pipe.

GM Locomotive Group - EMD plate

WDM-4 class locomotive at NRM, New Delhi

This assembly was located above the engine cylinders, so that even the drive from the cam shaft to the cylinder valves was simplified. Anything simpler leads to easier maintenance and reduction in failures.

Another example is the drive for the various auxiliary items like the traction motor, blower motors, auxiliary generator, exciter, etc. that are parts of any diesel engine. Here again, I would like to clarify to those not familiar with rail parlance that when I say 'engine' I am referring to the diesel engine only and not to the whole locomotive.

On the ALCO, all the auxiliary machines were driven through V-belts. There were 4 sets of V-belts on the engine's crankshaft. Failure of these belts was quite common leading to loco failure. In the GM design, there were no V-belts and all such items were driven through gears. Result – no failures.

A big advantage of the GM locos was that with 12 cylinders, as compared to the ALCO's 6, each cylinder produced half the horsepower of each ALCO cylinder. With less HP produced, working temperatures were far lower which is again good for the engine. If any person has seen a YDM4 working on full load at night, you will notice a red glow above from the exhaust chimney. That is how hot the exhaust gases of the YDM4 were. There was no such glow on the GMs.

Today, all the GM locos have been withdrawn from service and most of them have been condemned. To the best of my knowledge, two WDM4s have been preserved, one of them being plinthed at the National Rail Museum in Delhi while another within the Alambagh DLS at Lucknow. Of the MG locos, two YDM3s and one YDM5 have been preserved. Lest we forget these superb and exceptionally outstanding locos, it is good to remember that it was only the then policy of the General Motors Company of not allowing transfer of technology that we did not manufacture these locos and built the ALCOs instead. I am not saying that the ALCOs did badly; they were the work horse of the Indian Railways for about 30 years. All I am conveying is that the GMs are likely to have been even better.

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A CENTURY ILLUMINATED

From Steam Plumes to Electric Currents

From Coal-fired Behemoths to Electric Titans : A Centennial Chronicle of Indian Railway Electrification

Rudranil Roy Chowdhury

Introduction

The Indian Railways, a colossal and intricate web of steel veins pulsating through the heart of the subcontinent, stands today not merely as a mode of transportation but as a symbol of national integration, progress and perseverance. Among its many milestones, the saga of railway electrification, now spanning a remarkable century, is a testament to India's relentless pursuit of modernization and technological prowess. This transformation, from the hissing fury of steam engines to the silent power of electric locomotion, is not merely a tale of engineering evolution but a chronicle of a nation's journey toward energy efficiency, operational excellence, and sustainable growth.

As we stand at the centenary mark of this transformative epoch, it becomes imperative to reflect upon the intricate tapestry of developments that have defined this voyage. From the initial coexistence and often contention between direct current (DC) and alternating current (AC) systems to the eventual unification under a singular electric vision, the path of electrification has been as challenging as it has been revolutionary. More than just a technological shift, it has redefined the rhythms of mobility, sharpened the edge of freight and passenger services and contributed profoundly to the socio-economic fabric of modern India.

The Era of Steam : A Glorious Prelude to Electrification

Long before the hum of electric traction reverberated across India's vast rail corridors, the mighty steam locomotive reigned supreme. It was on a historic day in 1853 that the first passenger train – an emblem of colonial ambition and industrial daring, chugged its way from Bombay to Thane, heralding the dawn of rail travel in the Indian subcontinent. For decades thereafter, steam engines with their towering silhouettes and rhythmic chuffs became an enduring feature of the Indian landscape, tirelessly ferrying passengers and goods across plains, mountains, and deserts.

Yet, beneath the awe and romance of steam lay a host of operational challenges. These iron giants, though robust in appearance, were plagued by inefficiencies—consuming prodigious quantities of coal and water, demanding intensive maintenance and emitting clouds of smoke that darkened both skies and lungs. As the 20th century unfurled, bringing with it the winds of industrial expansion, burgeoning cities and mounting demands on infrastructure, the limitations of steam locomotion grew increasingly conspicuous. It was within this crucible of necessity and ambition that the idea of electrification began to take root—a visionary step toward cleaner, faster and more reliable railway operations.

The Compelling Case for Electrification

As the dawn of the 20th century illuminated the Indian subcontinent, the rhythmic clatter of steam locomotives continued to echo across its vast and varied landscapes. These iron workhorses, once the marvels of mechanical engineering, had entrenched themselves as the lifeline of Indian Railways. Yet, beneath their formidable exteriors and dramatic plumes of smoke lay an antiquated technology struggling to keep pace with the accelerating demands of an evolving nation.

Steam locomotives, though emblematic of a glorious past, were increasingly revealing their shortcomings. The insatiable appetite for coal and water imposed an enormous burden on the railways' operational economy. Every journey demanded meticulous logistical coordination to ensure adequate refuelling stops, often compromising speed and efficiency. Moreover, the environmental toll of these behemoths became an undeniable concern —billowing clouds of soot and ash darkened city skies and permeated the lungs of countless citizens, presaging the health and ecological anxieties of a more environmentally conscious age.

Their mechanical complexity, while a feat of craftsmanship, rendered steam engines susceptible to frequent breakdowns and exhaustive maintenance routines. The sheer effort required to keep them functional with a legion of firemen, drivers and maintenance crews highlighted a glaring inefficiency. In an era increasingly defined by the virtues of speed, economy and sustainability, the imperative for a more advanced form of traction became not just desirable, but inevitable.

Inspired by technological strides in Europe and North America where electrified railways had already demonstrated superior performance, Indian Railways began to look toward electricity as the beacon of the future. Electrification promised a mode of transport that was swifter, cleaner, more cost-effective and infinitely more reliable. Thus began one of the most ambitious transformations in the annals of Indian transportation.

Advent of Electrification : Laying the First Tracks (1925-1957)

The first sparks of this electric revolution were ignited on a momentous day – **February 3, 1925**, when the inaugural electric train glided from Bombay Victoria Terminus (now Chhatrapati Shivaji Maharaj Terminus) to Kurla on the Great Indian Peninsula Railway. Covering a modest distance of 16 kilometres, this historic journey was powered by a 1.5 kV Direct Current (DC) system, marking the genesis of electric traction in Indian Railways.

Though limited in geographic scope, this initial electrification effort was a harbinger of transformative potential. The bustling metropolis of Bombay with its burgeoning population and pressing need for efficient urban transit served as the perfect crucible for this pioneering technology. Drawing inspiration from contemporaneous developments in

Image courtesy: Jakob Stilling

EF/1 4502 'Kekda' is one of the earliest electric locomotive used in Indian railway system built in 1928

European capitals, the Bombay suburban system became the testing ground for India's electric ambitions.

Buoyed by the success of this pilot venture, the railway authorities embarked on a gradual yet deliberate expansion of the electrified network – primarily focusing on suburban corridors where the frequency of service and passenger volumes justified the investment. Over time, the rhythmic glide of electric trains became a familiar and welcome sound across the Western region, offering a stark contrast to the thunderous labour of steam.

Technological Renaissance in Early Electrification

The early phase of railway electrification in India was characterized by a spirit of innovation and adaptation. The choice of the 1.5 kV DC system, though in keeping with prevailing European standards of the time, necessitated a complete rethinking of railway infrastructure and locomotive design. Several pioneering advancements underscored this period of transformation –

1. **Overhead Electrification Systems**: The installation of overhead electric wires represented a radical departure from conventional rail infrastructure. These aerial arteries, carefully strung above tracks, served as conduits of uninterrupted power thereby delivering the energy required to propel massive trains with grace and precision.
2. **Birth of the Electric Locomotive**: With electrification came the advent of a new generation of locomotives—sleek, powerful and far more agile than their steam-driven predecessors. These engines boasted superior acceleration, smoother handling, and the ability to maintain higher average speeds, thereby revolutionizing both suburban and mainline operations.
3. **Establishment of Power Infrastructure**: Electrification demanded a robust network of power stations and substations strategically situated along railway lines. These installations ensured a consistent supply of electricity, safeguarding against disruptions and enabling seamless operation over vast distances.
4. **Introduction of Regenerative Braking**: In a nod to ecological foresight, early electric trains incorporated regenerative braking technology. This ingenious system converted kinetic energy into electrical energy during deceleration, feeding it back into the grid—a remarkable innovation that enhanced energy efficiency and minimized waste.

Foundations of Electric Infrastructure

As electric traction began to chart its course through the veins of Indian Railways, the imperative for specialized infrastructure soon became manifest. In response, the very first Direct Current (DC) locomotive shed was established at Kalyan, a strategic location in the Mumbai region. This facility became the cradle for nurturing a new breed of locomotives which were sleek, silent and efficient—marking a stark departure from the soot-laden giants of steam.

Kalyan's loco shed was more than a repository of engines; it was a symbol of transition, meticulously engineered to accommodate, maintain and service the nascent DC electric fleet. Simultaneously, DC EMU sheds—dedicated to Electric Multiple Units—emerged across the Mumbai suburban expanse, heralding a revolution in urban mobility. These sheds served as sanctuaries for the EMUs that would soon become the heartbeat of Mumbai's local train network.

It was in the late 1920s that Mumbai first witnessed the rhythmic hum of DC EMUs slicing through its tracks. These self-propelled units, adorned with a modern aesthetic and engineered for rapid urban transit offered commuters a level of speed, punctuality and comfort hitherto unimaginable. In their quiet efficiency, they laid the foundation for what would evolve into one of the most extensive and densely utilized suburban railway systems in the world.

AC Ascendancy : Sheds, Systems & Suburban Symphony

In 1957, Indian Railways decided to adopt 25 kV 50 Hz AC traction based on French Railway (SNCF) technology. The first 25kV AC electrified section was Burdwan-Mughalsarai, completed in 1957, followed by the Tatanagar-Rourkela section on the Howrah-Bombay route. The first actual run (apart from trial runs) using 25kV AC was on 15th December, 1959 on the Kendposi-Rajkharswan section (SER).

One of the earliest mainline DC locomotive of Kalyan shed

First AC electric locomotive to run in Indian railway system imported in November 1958.

1928 stock EMU Motor Coach one of the first coaches used for EMU services in the Bombay suburban section

With the ascendancy of 25 kV Alternating Current (AC) as the preferred system for railway electrification, the landscape of Indian Railways underwent yet another profound transformation. The first AC locomotive shed was inaugurated at Asansol, the historic railway junction in West Bengal. This facility became the nerve centre for the maintenance and operation of AC electric locomotives, which would soon command both passenger and freight services across eastern India.

To complement the expansion of AC traction into suburban domains, dedicated AC EMU sheds were established in Kolkata, ushering in a new era of urban rail travel. By the 1960s, the first AC-powered EMUs began plying the tracks of the city's suburban network. They brought with them a marked enhancement in speed, acceleration and capacity—an urban transit renaissance that paralleled the city's industrial and demographic growth.

This gradual proliferation of AC infrastructure not only reflected technological progress but also indicated a maturing railway system, capable of harmonizing its engineering ambitions with the practical needs of a rapidly urbanizing populace.

The EMU Epoch : A Paradigm Shift in Commuter Rail

The advent of Electric Multiple Units represented more than just an engineering innovation—it was a paradigm shift in the very philosophy of rail transportation. Unlike conventional train configurations that required a separate locomotive, EMUs embodied the principle of distributed propulsion wherein each carriage bore its own electric motors, enabling greater agility and responsiveness.

The impact was immediate and transformative –

1. **High-Frequency Operations**: EMUs facilitated shorter headways between trains, allowing the railways to cater to burgeoning urban populations with grace and reliability.
2. **Superior Acceleration and Braking**: Free from the inertia of a single locomotive, EMUs could accelerate and decelerate swiftly, reducing journey times and enabling more stops without compromising schedules.
3. **Enhanced Energy Efficiency**: The energy dynamics of EMUs, particularly those equipped with regenerative braking ushered in an era of conservation where kinetic

First indigenously built AC electric locomotive by CLW in 1963

A decades old AC EMU motor coach

One the old DC EMU Motor Coaches...

energy was no longer squandered but recycled.

4. **Passenger Comfort and Safety**: Spacious interiors, improved ventilation and refined ride quality made EMUs the preferred mode of transport for millions. Safety mechanisms were progressively integrated, aligning with evolving standards of commuter well-being.

The arrival of EMUs in the cityscapes of India did not merely alter commuting patterns, it reshaped the urban psyche. In Mumbai, the lifeline of the city—its suburban railway, grew to become not just a mode of transit but a cultural artery, pulsating with the rhythms of millions.

The electric local train became an equalizer – conveying the office-goer, the vendor, the student and the householder with stoic regularity. It wove disparate classes into a shared civic journey, catalysing urban sprawl and enabling the rise of satellite towns and suburban dormitories.

Kolkata's EMU corridors enabled the seamless flow of humanity from the cultural nucleus of the city to its intellectual hinterlands. The railway became the quotidian stage, upon which the drama of Indian urban life was played out—hurried glances, weary silences, hawkers' cries and the serenity of shared fatigue.

Illuminating Progress : The Early Fruits of Electrification

The pioneering steps toward electrification yielded a harvest of tangible benefits for Indian Railways and the nation at large –

1. **Enhanced Speed and Operational Efficiency**: Electric traction enabled swifter acceleration, leading to reduced travel times across both suburban and long-distance corridors.
2. **Economic Prudence**: Over time, the cost-per-kilometre of electric operations proved significantly lower than that of steam or diesel alternatives.
3. **Environmental Stewardship**: The move away from coal-burning locomotives marked a crucial step in reducing air pollution and conserving fossil resources.
4. **Catalyst for Urban and Industrial Growth**: Electrified railway lines facilitated the seamless movement of goods and people, fostering economic hubs and industrial corridors.
5. **Operational Reliability**: Electric engines required less downtime, translating into more punctual services and higher asset utilization.

Overcoming the Crucible : Challenges of Early Electrification

Despite its many virtues, the journey toward electrification was far from untroubled. The early decades were strewn with formidable obstacles –

1. **Capital-Intensive Undertakings**: The installation of catenary lines, substations and rolling stock demanded vast financial resources in a nation still finding its economic footing.
2. **Technical Know-How**: India initially lacked the domestic expertise required for such a transformation, necessitating collaborations with international engineers and advisors.
3. **Inter-zonal Inconsistencies**: The cohabitation of DC and AC systems created a patchwork network, complicating operations and locomotive interoperability.
4. **Power Supply Limitations**: In the mid-20th century, India's electrical grid was in its infancy, posing significant challenges in ensuring a consistent and robust power supply.
5. **Institutional Inertia**: Entrenched preferences for steam traction among railway personnel, rooted in decades of familiarity, presented a cultural resistance to change.

Yet, the Indian Railways persevered, navigating these trials with determination and vision.

Guardians of the Transition

While the centenary of railway electrification rightly commands celebration, it would be a grave omission to bypass the invaluable epoch of diesel traction – a robust and unflagging era that, for over ten decades, bore the nation's railway aspirations across all terrains with unfaltering loyalty. The diesel locomotives, often dubbed the "Iron Sentinel," emerged as the transitional colossus that bridged the ancient thunder of steam with the silent surge of electric current.

The Rise of the Diesel Titans : A Nation in Motion

The chronicles of diesel propulsion in India date back to the 1930s and 1940s when small diesel locomotives were experimentally employed in select yards of the North Western Railway. Though modest in scale and scope, these initial trials reflected a growing awareness of the limitations of steam and a curiosity about alternative power. As India embarked upon a more structured and far-reaching dieselisation drive in the pre-Independence decades, the narrow gauge (NG) and metre gauge (MG) networks, then spanning vast tracts of the Western, Northern, Central and nearly the entire Southern Railway systems witnessed the

advent of dedicated diesel classes that would come to define mobility in their respective domains. The importation and eventual indigenous production of ZDMs & NDMs heralded a new era for the narrow-gauge systems, long considered vulnerable and logistically challenging due to their reduced axle loads and sinuous alignments. These light yet resilient locomotives, often operating in some of the most remote and topographically demanding regions of the country, played a silent yet profound role in sustaining economic and social life in areas where higher gauge infrastructure was yet to reach. Simultaneously, the metre-gauge corridors, once the lifeblood of regional connectivity and princely enterprise, were empowered by the advent of the YDM Class locomotives. These versatile machines, introduced through a blend of foreign collaboration and indigenous engineering acumen, soon became ubiquitous across MG strongholds. They roared across the arid expanses of Rajasthan, negotiated the hilly terrains of the Aravalli & Nilgiris, meandered through the Himalayan foothills in Bengal & Assam and served the lush belts of Tamil Nadu & Karnataka with unyielding dedication. In the princely dominions of Travancore, Mysore, Baroda and Gwalior, as well as in the colonial provinces of Bombay and Madras Presidencies, these diesel locomotives helped knit far-flung territories into the emerging postcolonial nation-state through reliable and timely rail connectivity.

However, the actual advent of diesel traction in India can be traced back to the post-independence years, with the first mainline diesel locomotive introduced in 1957 – the WDM1, imported from American Locomotive Company, U.S.A. These machines brought with them a new doctrine of mobility – one that married power with practicality, range with resilience. The WDM series, particularly the iconic WDM2, manufactured indigenously at the Diesel Locomotive Works (DLW) in Varanasi would soon become a ubiquitous presence across the subcontinent, hauling passenger expresses, long-haul freight, military convoys and emergency relief with equal resolve.

Where electrification had yet to unfurl its wires, it was diesel that held aloft the torch of connectivity. From the dense

A WDM-1 class locomotive

The most trusted WDM-2 class locomotive

jungles of the North East Frontier to the saline deserts of Rajasthan, from the remote Himalayan foothills to the wind-swept plateaus of the Deccan, the growl of diesel locomotives became synonymous with hope, sustenance and speed.

Diesel's Pivotal Role in the National Railway Mosaic

The diesel age was not merely an interregnum between steam and electric traction – it was a definitive era in its own right, replete with engineering advancements, strategic deployments, and cultural significance. A few of its towering contributions include –

- **Hauling of Prestigious Trains**: It was the diesel-powered WDM4 that first hauled the nation's pride aka the inaugural *Rajdhani Express* from Howrah to New Delhi in 1969, showcasing diesel's capability in delivering speed, punctuality and passenger comfort on long-distance routes.
- **Lifeline in Remote Terrains**: Diesel Multiple Units (DMUs), Diesel Hydraulic EMUs (DHEMUs) and Diesel Electric Multiple Units (DEMUs) emerged as vital lifelines for hinterland and semi-urban India. These self-propelled carriages ventured far beyond the reach of overhead wires, connecting the remotest hamlets with burgeoning cities, ferrying students, farmers and labourers alike.
- **Emergency Support**: In times of national exigency, diesel locomotives like YDMs, WDMs etc. proved their mettle. Be it troop movement during wartime mobilizations, evacuation missions during natural disasters or the unforgettable grid collapse of 2012 that left much of North India paralyzed, diesel giants roared into action, rescuing stranded trains and restoring connectivity when the electrified arteries fell silent.
- **Operational Versatility**: Unlike electric traction, which necessitated fixed infrastructure, diesel locomotives offered unparalleled flexibility. They were deployed with ease on non-electrified routes, on construction trains laying new lines and in areas of disrupted supply, often serving as dependable stand-ins during maintenance

blocks or power outages.

Twilight and Legacy : The Gradual Eclipse

With the dawn of the 21st century and the exponential pace of electrification, the once-mighty diesel steeds began their gradual retreat. The strategic focus shifted towards electrified corridors, both to reduce carbon emissions and to optimize operational costs. Yet, this phase-out was no abrupt vanishing – it was an honourable withdrawal. Even as late as 2019, diesel locomotives not only continued to haul prestigious trains but also rescued a Vande Bharat during catenary breakdown along with taking part in the high-speed trial runs of a Talgo rake.

The final conversion of major diesel sheds into electric-only facilities symbolized the setting sun of an era. Yet, in many parts of the country, diesel continues to breathe life into lesser-known routes, last-mile freight yards and industrial sidings. In the grand tapestry of Indian Railways, diesel locomotives form the stoic, muscular middle – standing tall between steam's roaring dawn and electricity's luminous ascent. Their relentless service, often away from the limelight, formed the spine upon which the modern railway system was built. They were the unsung guardians of reliability, stepping in when systems failed, venturing where wires dared not go and bearing the burden of a nation's mobility with dignity and grit. To forget their legacy would be to erase a vital heartbeat from the nation's steel arteries.

Post-Independence Electrification : A March Towards Modernity

With the thunder of Diesels now receding into the annals, our gaze turns once more to the electric – the enduring harbinger of modernity and momentum. The aftermath of India's independence heralded a renewed national resolve to modernize infrastructure. Electrification gathered unprecedented momentum in the ensuing decades, with projects targeting vital arterial routes –

- The **Howrah-Burdwan section**, originally electrified with 3 kV DC, was subsequently converted to the 25 kV AC standard.
- The **Chennai Suburban network** emerged as a model for southern India's urban transit electrification.
- The **Delhi-Howrah** and **Delhi-Mumbai** corridors, critical to national integration were among the first to see high-volume AC electrification.

By the late 1960s, the 25 kV AC system had gained universal acceptance, emerging as the definitive standard for Indian Railways.

Indigenous Evolution : The Rise of Indian-Made Electric Locomotives

The nascent electric fleet of India was, in its early avatar, a child of European ingenuity. Locomotives imported from firms in the United Kingdom, France and Japan traversed the Indian plains under the foreign banners of their makers. Yet, as the wheels of sovereignty turned and India awakened to her industrial potential, a new epoch dawned.

A CLW built WAM-4 class locomotive

The establishment of **Chittaranjan Locomotive Works (CLW)** in 1950, nestled amid the rolling greens of West Bengal, marked the advent of domestic electric locomotive production. Here, under roofs echoing with the clangour of ambition, India's engineers and craftsmen gave shape to locomotives born of Indian hands and minds. The **WAG/WAM/WAP** series soon emerged, marrying indigenous design with world-class performance.

In the decades to follow, India did not merely assemble; she innovated. From Mercury Arc Rectifier to Silicon Rectifier which efficiently controlled the DC Traction Motors, then from Thyristors to modern IGBT powering three-phase asynchronous traction motors and from relay-controlled electricals to fully software based locomotive control system, Indian Railways steadily progressed toward technological sovereignty. This tale of industrial self-reliance deserves a luminous place in the pantheon of railway electrification.

Divergent Paths : The DC-AC Dichotomy

While the western region, particularly Bombay and its hinterlands, emerged as the stronghold of 1.5 kV DC traction, Indian Railways soon faced a strategic crossroad.

WCG-2 class DC locomotive

A WCAM-1 class DC locomotive

A WCAG-1 class DC locomotive

The limitations of DC systems – chiefly in terms of power transmission over long distances and the cost of substations prompted engineers and policymakers to explore alternatives for mainline operations.

The turning point came in 1957, when Eastern Railway scripted a new chapter in the electrification narrative. The Howrah – Burdwan section, an arterial route of national importance, was electrified using the 25 kV Alternating Current (AC) system – a technological leap corroborated by comprehensive research and global best practices. AC traction offered multiple advantages – greater energy efficiency, reduced infrastructure costs and better scalability for long-distance, high-speed services.

This shift, however, introduced a curious duality in the Indian railway system. While the Western zone continued its steadfast reliance on DC traction for its dense suburban network, the Eastern and subsequent zones embraced the 25 kV AC system as the standard for mainline electrification. Thus began a prolonged period of coexistence between two traction paradigms — a situation that, while functional, added layers of complexity to operations, maintenance and equipment design.

Nevertheless, this divergence did not deter the forward march of electrification. Instead, it reflected the adaptive ingenuity of Indian Railways — a willingness to tailor solutions to regional needs while keeping an eye on technological convergence. In time, the merits of AC traction would become overwhelmingly clear, paving the way for a unified, electrified future.

The Dual Traction Era and its Resolution (1957–1990s)

While the 25 kV AC system forged ahead across most of the country, western India remained a bastion of 1.5 kV DC traction, particularly in the Mumbai metropolitan zone. This duality, while initially pragmatic, soon revealed its complications.

To manage the operational dissonance, Indian Railways developed hybrid locomotives such as the **WCAM** and **WCAG** series — engines capable of traversing both DC and AC territories. These technical marvels bridged the gap during an era of transition but added complexity to maintenance and production pipelines.

Realizing the inefficiencies of this bifurcated regime, Indian Railways embarked on a historic consolidation. The conversion of DC traction to AC began in earnest in the late 1990s. The process reached its culmination in 2016, when the last stretch of Mumbai's suburban system switched to 25 kV AC, bringing to a close the storied chapter of DC traction in India.

The Southern Symphony of MG Electric Traction

Amidst the grand narrative of Indian railway electrification, largely dominated by broad gauge undertakings, there lies a lesser-sung yet profoundly elegant chapter – the electrification of meter gauge lines in Southern India. This rare and ambitious venture executed with a boldness scarcely matched elsewhere in the subcontinent, bore witness to a remarkable experiment in railway engineering and a quiet triumph of cross-cultural collaboration.

YCG-1 - First MG Electric loco on Indian soil built in 1930 by Hawthorn Leslie & Co, UK

In the early 1960s, the Southern Railway, ever the harbinger of innovation, embarked upon the electrification of select meter gauge routes radiating from Chennai Egmore to Villupuram. But even before this large-scale implementation, Indian Railways had already dipped its toes into MG electric traction with the arrival of the YCG-1 class locomotives during the late 1930s. Imported from England, the YCG-1s were primarily trial units, introduced to evaluate the feasibility of 25 kV AC electrification on meter gauge. Although only a handful were procured, they set a vital precedent and provided invaluable insights into the complexities of meter-gauge electrification – paving the way for future developments.

This visionary groundwork culminated in the introduction of the YAM1 class locos – an exceptional breed that symbolized the technological romance between Japan and Indian Railways. YAM1s were manufactured by a consortium of Japanese firms led by Hitachi, Mitsubishi and Toshiba. Delivered between 1964 and 1966, a total of 20 locomotives graced the southern meter gauge network. Clad in a distinctive maroon and cream livery, these locomotives exuded a quiet elegance with their rakish Japanese styling and compact frame suited to the narrow confines of the meter gauge.

Electrically, they were powered by 25 kV AC overhead systems and mechanically they bore the hallmarks of Japanese finesse with compact traction motors, light axle loads and a Bo-Bo wheel arrangement. Their versatility allowed them to haul both passenger and freight trains across the undulating terrain of Tamil Nadu. In them, the Indian Railways found a workhorse with the heart of a thoroughbred – sturdy, dependable, and aesthetically graceful.

But the meter gauge electrification tale does not end with the YAM1s. In parallel, the Southern Railway introduced meter-gauge EMUs to serve burgeoning suburban corridors around Chennai. These EMUs were mechanical and aesthetic cousins of their BG contemporaries but scaled to fit the narrower gauge. They offered swift, clean and frequent suburban travel, bringing a measure of modernity to the temple towns and agrarian heartlands of the South. These meter gauge EMUs, often resplendent in customary green and cream livery, glided gracefully over the palm-lined tracks with their pantographs dancing in harmony with the catenary above. Their presence transformed the regional mobility landscape, making short-distance rail travel an efficient and comfortable affair for students, traders, pilgrims, and workers alike. One might consider them the emerald chariots of the South, a true ephemeral blend of engineering and elegance.

YAM-1 class meter-gauge locomotive

A meter-gauge EMU rake

Though the saga of meter gauge electrification was brief, curtailed by the sweeping tide of Project Uni-gauge in the late 20th century though its legacy is far from diminished. It represented a rare and bold deviation from convention, a testament to Indian Railways' willingness to experiment with multiple technological frontiers. The YAM1s and their EMU siblings were not merely locomotives and coaches, they were ambassadors of progress, symbolizing the confluence of tradition and transformation in a region steeped in heritage.

Today, only memories and a few preserved relics remain of this enchanting interlude. Yet, to the discerning student of Indian Railway history, the meter gauge electrics of Southern India stand as a poignant reminder that even in the smaller gauge tracks, the spirit of innovation can run wide and deep.

Modern Electrification & the Quest for Sustainability (2000–Present)

As the new millennium unfolded, Indian Railways recommitted itself to electrification, not merely as an operational upgrade but as a cornerstone of national sustainability strategy –

- **Major Trunk Routes** including the Delhi-Mumbai, Delhi-Kolkata and Chennai-Mumbai corridors achieved full electrification.
- **Dedicated Freight Corridors**, engineered for high-load operations, embraced electric traction for its unmatched efficiency.

WAG-9 class 3-phase freight locomotive (31000 to 31021 imported from ABB)

A 12000 hp dual unit WAG-12B class freight locomotive

- The ambitious **'Mission 100% Electrification'** was unveiled, aiming to electrify the entire broad-gauge network by 2030. As of 2025, Indian Railways has electrified 98.83% of its broad-gauge network, covering 68,701 route kilometres – a testament to the vision and execution.
- Technological advancements such as the WAG-12B (India's most powerful freight locomotive) and WAP-7 (a high-speed passenger engine) redefined the capabilities of electric traction.

Innovations in regenerative braking, smart substations and overhead electrification have further enhanced the efficiency and environmental footprint of operations.

The Role of Electric Traction in Environmental Diplomacy and Climate Commitments

As the clarion call of climate action echoes across the globe, Indian Railways has emerged not merely as a participant but as a torchbearer in the environmental arena. The embrace of electric traction stands as a central pillar in India's pledge toward Net-Zero Emissions by 2070, with the Railways ambitiously advancing this timeline to 2030 for its own network.

The shift from diesel to electric traction has yielded dramatic reductions in carbon dioxide emissions, particulate matter and nitrogen oxides. Moreover, Indian Railways has taken the additional leap of integrating renewable energy into its traction supply through solar farms, wind installations and green substations.

Emergence of High-Speed Rail Possibilities

Beneath the silent glimmer of electric catenaries lies the embryonic promise of velocity unimagined. The robust 25 kV AC traction infrastructure, now ubiquitous across the subcontinent, is not merely an engineering standard—it is the bedrock upon which India's high-speed aspirations shall ascend, steadfast and sublime.

In this luminous tapestry of modernisation, the advent of the **VandeBharat Express** heralded a renaissance in self-reliant rail innovation. Inaugurated in February 2019 on the hallowed stretch between New Delhi and Varanasi, the VandeBharat emerged not as an imported marvel but as a

3-phase Bo-Bo type light passenger locomotive class WAP-5 (30000 to 30010 imported from ABB)

Indigenously built semi-high speed trainset - Train18 aka VandeBharat Express

VandeMetro - the newest sensation of the nation *Image courtesy: Rahul Nivaskar*

symbol of indigenous prowess—its aerodynamic silhouette, distributed propulsion, and plush interiors reflecting a quiet but resolute revolution. Travelling at a brisk 160 km/h in revenue service, it was not merely a train, but a declaration—that India could dream in steel and execute in precision.

The resounding success of the VandeBharat set in motion a new chapter: the conceptualisation of the **VandeMetro**. Designed for high-frequency operations over short to medium distances, the Vande Metro shall bridge urban sprawls and their satellite cities, offering travel at speeds up to 200 km/h. With rapid acceleration, energy-efficient regenerative braking, and a commuter-centric design, it aspires to dissolve the tyranny of time in India's most congested corridors. It will connect hearts and habitations, industries and institutions, thus shaping a future where regional transit is swift, seamless, and supremely civilised.

No less remarkable is the emergence of the **Rapid Rail Transit System (RRTS)**—India's foray into dedicated, high-speed suburban corridors engineered specifically for intercity passenger flow. The Delhi–Meerut corridor, the vanguard of this initiative, witnesses trains gliding at 180 kmph, stopping at meticulously designed stations, all under the aegis of a new operational paradigm. Unlike traditional rail or metro systems, RRTS represents a hybrid model—fast, frequent, and futuristic—thereby closing the spatial chasms between India's booming metropolises and their hinterlands. Its success will be measured not only in kilometres covered, but in the upliftment, it offers to daily lives.

The Alstom built trainset of Delhi-Meerut RRTS *Image courtesy: Sourav Kumar Yadav*

All of these modern marvels—VandeBharat, VandeMetro, RRTS—are not isolated phenomena, but natural culminations of a long and arduous electrification journey. Without the foundational legacy of the 16-km DC line in Bombay in 1925—without the toiling decades that birthed today's 70,000-km web of 25 kV AC lines—such dreams would have remained spectral. Indeed, the **Mumbai–Ahmedabad High-Speed Rail Corridor**, imbued with the spirit of the Shinkansen and designed for 320 km/h, would be inconceivable in the absence of this electric lineage. The wires strung across India's firmament are not merely carriers of current—they are conduits of continuity, connecting our past with a future streaking fast into view.

Thus, electric traction is not merely a chapter in India's railway history, it is the prologue to the nation's tryst with ultra-modernity.

Towards a Radiant Horizon

As Indian Railways commemorates a century of electrification, it does so not merely in retrospect but with a gaze fixed firmly on the horizon. What began with a modest 16-km DC line in Mumbai that has today blossomed into an electrified expanse that binds a continent-sized nation with silent efficiency and boundless ambition.

The journey from Steam to Diesel followed by DC and then to AC traction, mirrors India's own odyssey which is rooted in tradition, tested by adversity and buoyed by innovation. With electrification forming the backbone of a broader vision for carbon neutrality by 2030, the future promises not just modernity but sustainability.

Thus, each arc of current that pulses through the overhead lines now serves a dual purpose – propelling steel and wheel and upholding the covenant between man and nature. In the decades ahead, the railway's gleaming wires may carry not only electricity but also the aspirations of a billion souls that will propel India into a new age of green, seamless and dignified mobility.

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COVER STORY

A Centennial Ode in Colour & Current

Celebrating the Centenary Year of Electric Traction

Indian Railways, our national carrier, has all geared up to celebrate a very significant milestone that has changed the socio-economic dynamics of the nation. Yes, it's the Centenary Year of Electric Traction that is being referred here. With the Steam Traction now limited to some select heritage services only and the Diesel Traction made to take backset with active pursuit of "Mission 100% Electrification" by our transporter-in-chief, the completion of 100 years of Electric Traction has garnered even more essence than ever. The railways have unveiled a commemorative logo for the occasion followed by instructions to every zone to make the Electric Locomotive Sheds under their respective jurisdictions to mark the event. With this, rail aficionados across the zones went gaga as they proposed various liveries, some of which were subsequently approved by the concerned officials that paved the way for outstanding outcomes in the form of liveries we are witnessing today. Be it for the initiatives of different ELSs under *Eastern Railway, South Eastern Railway, East Coast Railway, South Western Railway, South Central Railway* or *Southern Railway* – all the special liveries are testimonies of creative minds that have always bridged the gap between the railways and its admirers.

We shall scroll past each of the initiatives undertaken by different sheds under the various zonr of Indian Railways.

- Somsubhra Das (covering Howrah initiatives)

:: The Initiatives of Eastern Railway ::

• ***Initiatives by the Howrah Electric Locomotive Shed***

The Saptaswa of Howrah ELS :

For the iconic Howrah Electric Locomotive Shed (ELS) under Eastern Railway, 2025 is a year to reckon as the Howrah Division itself is completing 100 Glorious Years! We, Team

Team TrainTrackers giving the vote of thanks to Sr. DEE of Howrah ELS & the 'SAPTASWA' Diesign.

TrainTrackers, realizing the momentousness, came up with the proposal for nomenclature of the last seven allotted WAP7 class locomotives of HWH ELS – 3 brand new ones from the Benaras Locomotive Works bearing road numbers 37777, 37778 & 37779 and another 4 factory fresh ones from the Patiala Locomotive Works having road numbers of 39408, 39409, 39410 & 39411. Our proposal found favour with none other than *Sri Sandip Kumar Chatterjee, Sr. Divisional Electrical Engineer/TRS/HWH* of the Howrah Electric Locomotive Shed who not only gave an instant go ahead but also suggested the pattern of the stickers that were to be mounted on the locomotives indicating the names. The proposed names included **GAYATRI**, **TRISHTUP**, **JAGATI**, **ANUSHTUP**, **PANKTI**, **BRIHATI** and **USHNIK** which actually are the names of the seven horses yoked to the Sun God's (Surya devata) chariot as per Veda Samhitas, Visnu and Surya Puranas. Again, as per a hymn of the Yajur Veda, these 7 names appear as **"गा॒य॒त्रीत्रि॒ष्टु॒ब्ज॑गत्यनु॒ष्टु॒प्प्र॒ङ्क्त्या सह।बृ॒ह॒त्युष्णि॑हाक॒कुप्सू॒चीभिः॑शम्यन्तु॒त्वा॥**यजुर्वेदअध्याय२३मन्त्रसंख्या३३**)"**. The 7 horses also represent the 7 colours of rainbow or the 7 constituent colours of White Light emitted by the Sun or the 7 days of the week. These 7 horses are also named after the seven meters of Sanskrit prosody. In Vastu Shastra, the seven horses are associated with good luck and positive energy as well. They are again said to represent the seven directions like North, South, East, West, Northeast, Southeast and Northwest.

In a way, these 7 christened WAP7 locomotives become the 'SAPTASWA' of the HOWRAH ELS where Saptaswa stands for 7 horses in Bengali language.

The Other Named Electric Runners – Rajatsubhra and Anubha :

After successful implementation of the 'SAPTASWA' proposal, we went a step further to christen another WAP7 class locomotive #30795 as '**RAJATSUBHRA**' which means 25 years in Bengali to commemorate the completion of 25 glorious years of service of WAP7 class locomotives to the nation under the same umbrella of Centenary Year of Electric Traction. This also went off well as Sri Chatterjee once again approved our proposal with the blink of an eye. But then came the most challenging part!

Naming a locomotive of HWH ELS was not exactly a new initiative on the part of Team TrainTrackers as back in 2019, we had christened WAP7 #37025 as '*ASWAMEDH*' for it being the 150th Locomotive of HWH ELS then. But never ever had

Image courtesy: Team TrainTrackers

any locomotive of HWH ELS been found sporting livery other than the standard ones and we badly wanted to make something of this sort to happen with at least one locomotive of our 'native ELS'. Soon, we were again knocking the doors of Sri Chatterjee. He understood the scope and our vision to commemorate the occasion. Two liveries prepared with the joint endeavour of Team TrainTrackers and fellow railfans Sri Sourav Dutta and Sri Ayan Dutta were tabled before him, of which, one was chosen for execution. But wait, there would be no vinyl prints and the entire scheme has had to be done by hand paint! A herculean task completes with colossal challenges. While planning for the execution part of this uphill task, Sri Chatterjee suggested for naming the chosen locomotive (WAP7 #37400) which would get draped in the special livery. Accordingly, after a joint exercise, it was decided to name the electric sprinter as '**ANUBHA**' which means 'Lightning' in Bengali.

Members of Team TrainTrackers along with fellow ferroequinologists Sri Sourav Dutta, Sri Sumit Nath and Sri Rupam Dey headed by some staff of the HWH ELS then embarked on the 'Mission Impossible'. Paper stencils corresponding to different patterns of the proposed livery were prepared with utmost care. Then, application of various shades of colours over them was made to achieve the desired result. A good 7 days passed in a whisker as the 'special team' went about their business with duty hours often exceeding 12 hours a day. At last, surmounting all challenges as they say, "Where there is a will, there is a Way....", we went from Mission Impossible to Mission Accomplished on 03.04.2025. This success story is sweeter than ever as it has the blood and sweat of the above railfans who spared their personal time and office commitments to infuse and impart some colours in the otherwise monotonous world of the standard uni-livery. Chorus of accolades along with waves of compliments poured in from different zones for the unique livery hailing our success as HOWRAH ELS finally got one of her white stallions painted in distinctive colours beyond the routine customary shades.

Images courtesy: Team TrainTrackers

We, from Team TrainTrackers, express our sincere gratitude to *Sri Sandip Kumar Chatterjee, Sr. Divisional Electrical Engineer/TRS/HWH* of the Howrah Electric Locomotive Shed without whose keen interest, support and encouragement we would not have been able to fulfill our dreams. We too deeply appreciate all other Officials of the shed including *Sri Parimal Mukherjee* and *Sri Dibyendu Baine* - both SSEs of G1 Section together with other Staff involved in the project like *Sri Pranab Chakraborty*, Technician of G1 Section, who took it upon themselves for perfect execution of our projects thereby encouraging us for more of such collaboration in times to come.

- Somanko Tiru *(covering Asansol Initiative)*

• Initiative by the ASANSOL Electric Locomotive Shed

Asansol ELS was established in the year 1959 as India's first AC Electric Loco Shed. Kalyan ELS which was set up a lot earlier, started its journey as a DC Electric Loco shed. Asansol ELS used to cater the major chunk of Eastern Region during the early 60s, with its Electric Fleet. ELS ASN joined the party of celebrating the Centenary Year of Electric Traction in India after Howrah ELS named 7 of their new WAP 7s during this period as per the proposal given by Team TrainTrackers. So, it was time for planning something for Asansol ELS, which is another pivotal shed under Eastern Railway.

On 5th February 2025, along with a fellow Rail Enthusiast, Soham Das, we approached the **Mr Prabhat Kumar**, Sr. DEE/TRS/Asansol with a proposal, who welcomed us. With references to all the different initiatives carried out across different zones in IR, we gave proposal to name a locomotive of Asansol ELS to commemorate the Centenary Year of Railway Electrification. I started the initial planning on 19th January 2025, when we got to know Asansol ELS received a very fancy numbered loco, which is in turn a milestone locomotive from the Patiala Locomotive Works (PLW). WAG9HC #42000 was allocated to ELS/Asansol around the 3rd week of January and was due for rolling out from PLW. # 42000 was finally rolled out on 26th January, 2025 from PLW and it was the 500th WAG9-HC rolled out by them. WAP7 # 37777 which was rolled out by Banaras Loco Works for ELS/Howrah, was named as Gayatri, as a part of 100 Years of Railway Electrification Celebration, so #42000 was just appropriate for the said purpose.

Rupam Ghosh, another rail enthusiast, suggested a list of beautiful names for #42000. The list included Biva, Atri, Agniv, Ainesh, Ishakshi, Ojasvat among others. After a discussion with Sr DEE, AEE2 and SSE/G1, on a later date, it was decided that the name **'AINESH'** would be given to the locomotive. The meaning of Ainesh is Sun's Glory and yes, we are indeed celebrating Glorious 100 Years of Electric Traction so the name was apt.

Now came a twist. Everything was ready at the shed level but the locomotive concerned still had not made its way to the shed. As we had IRFCA Convention 2025 in Asansol, I had few more opportunities to meet the officials in Asansol ELS. On 22nd February, when I visited ASN ELS for the third time regarding this matter, it was almost a month that #42000 had been rolled out from PLW but was yet to reach its home. It was however found out that it was not being released from traffic for achieving the target set for that corresponding Financial Year. Finally on 19thMarch, in the morning, Mr Atanu Biswas, AEE2/TRS/Asansol rang me up and conveyed the very much awaited news about the #42000 finally reaching Asansol ELS.

The road number stenciling pattern of #42000 was planned keeping in mind the few initial WAG9s of IR, especially # 31000. WAG9 #31000 which is the first WAG9 of Indian Railways along with some earlier turned out WAG9s had loco numbers marked beside the cab and not in the centre which is the most followed style. Even the initial WAP7s had the same style of markings. To recreate that nostalgia #42000 was marked as #31000. The name AINESH was marked on the same level that of #42000 but on the other side of the

Image courtesy: Team TrainTrackers & Anubad Chakraborty

body. I may also add that Asansol ELS had one named WAG9-HC earlier. #32949 was named as *Priyadarshinee* by the ELS at it was the first WAG9 of Asansol ELS which later got transferred to ECoR and is currently with Visakhapatnam DSL. So the void is now finally filled with the naming of # 42000. It is pertinent to mention that WAG9 #31619 christened as *Kabi Guru* is now homed by ASN ELS after it got transferred from BWN DLS and it happened to be its first WAG9.

The project wouldn't have been possible without the kind support and gesture of Mr. Prabhat Kumar (Sr.DEE/TRS/ASN), Mr Atanu Biswas (AEE2/TRS/ASN) for constantly coordinating and updating me about #42000, Mr Anjan Kr Mondal (SSE/G1/ASN) and his team of technicians (Mr Pujan, Mr Pappu, Mr Gautam and others) who were entrusted to mark the locomotive as suggested. The cooperation and coordination with Asansol ELS was such that without anyone of us being present at the ELS on the day of markings, the markings were done so accurately as per our proposal. I would like to extend my gratitude to my fellow Rail Enthusiasts Rupam Ghosh, for suggesting the names for #42000 and Soham Das who was with me at Asansol during our first meeting with Sr. DEE to discuss about the concept. I would also like to thank the entire team of Asansol ELS for their constant cooperation and support. Some ferroequinogist friends like Rajat Sao, Soumik Choudhary, Bhabesh Halder, Ansuman Satpathy, Anubad Chakraborty and Dipam Deyasi needs special mention for keeping me updated about the status of #42000. I am looking forward to bring up some more initiatives in the coming days.

- Shankhadeep Maiti *(covering the SER initiatives)*

:: The Initiatives of South-Eastern Railway ::

• Initiative by the Santragachi Electric Locomotive Shed

The journey of Electrification started way back in 1925 and the pace picked up over the last decade with "Mission Raftaar" showing the way. Time flied as we step into the Centenary Year of Electrification. Likewise, to commemorate the occasion, the Santragachi Electric Locomotive Shed under the South Eastern Railway undertook an exclusive initiative which was proposed by *'SER Fanatics'* Railfans Group.

For long, we have been planning to bring back the classic TATA WAM-4 Livery on any WAP-4 locomotive of ELS Santragachi (SRCE) and the Centenary Year of Electric Traction was a perfect occasion to execute our plan. Certain issues regarding the paintjob at SRCE landed us in the Kharagpur Railway Workshop (KGPW) with our proposal as several SRCE WAP-4 locos were scheduled for Periodic Overhauling (POH) there.

Initially, the concerned authorities did not show much intent or interest but later a turnaround happened as they planned themselves to execute the proposal on any of the SRCE

SRCE WAP-4 22398 stands idle at Electric Trip Shed, Kharagpur in new attire after POH.

WAP4s but with a twist. Instead of the TATA WAM-4 livery, the authorities wanted us to create something unique based on Tri-colour keeping the prime colour red as the basis of such livery.

Accordingly, we prepared designs with three different colour schemes and one of them was chosen and approved with minor changes by the KGPW personnel. The design got executed and the final result is there for everyone to see. After the 'Nabadiganta' initiative, SER Fanatics exclusively brings you another livery to the fore to do away from the boredom of uni-livery in the country!

- Ansuman Satapathy *(covering the ECoR iniatives)*

:: The Initiatives of EAST coast Railway ::

• Initiative by the Vishakapatnam Electric Locomotive Shed

The railways have been my heartbeat for as long as I can remember. Growing up in Brahmapur, Odisha, under the East Coast Railway (ECoR), I forged an unbreakable bond with their giants that thundered through my childhood. Among them, the WAG-6 Class locomotives from Visakhapatnam were my first heroes—strong and amazing, they sparked my dreams about trains. I am an IT Data Engineer, but my heart still belongs to the railways. Today, I am thrilled about something special – the ***Visakha Vijaya Rath***. It's a WAP-7 locomotive, bearing road number 39145, from the Visakhapatnam Electric Loco Shed wrapped in a very special livery which demonstrates the perfect way to celebrate 100 years of railway electrification inIndia (1925-2025). Truly, it's a Majestic Ode to the 100 Years of Electrification.

Commemorating a Century of Electrification:

To mark the centenary of electrification on Indian Railways (1925-2025), the Visakhapatnam Electric Loco Shed has unveiled a masterpiece – the *Visakha Vijaya Rath*, a WAP-7 locomotive (No. 39145/WATE). This initiative is not just a celebration of technological progress; it is also attributes to the cultural and industrial heritage of Indian Railways and

Image Courtesy: Arkopal Sakar

Images courtesy: Ansuman Satapathy & Arkopal Sarkar

Visakhapatnam.

Operational Excellence at Visakhapatnam ELS:

The Visakhapatnam Electric Loco Shed (ELS) stands as the largest facility of its kind in Indian Railways, managing an impressive fleet of 344 locomotives. This includes 88 WAP-7s, 2 WAG-5s, 7 WAG-5Ps, 30 WAG-5Ts, 7 WAG-9s, 86 WAG-9Hs, 124 WAG-9HCs and units a substantial inventory that highlights its critical role in maintaining railway operations. Amid this demanding workload, the shed successfully executed the *Visakha Vijaya Rath* project.

A Livery That Celebrates Vizag's Legacy & Flag-Off Ceremony:

The *Visakha Vijaya Rath* is more than just another WAP7 locomotive – it's a moving canvas that tells the story of Visakhapatnam. It's specially designed livery blends the Indian tricolor with iconic landmarks, showcasing the city's rich maritime, spiritual and industrial significance. The vibrant artwork features –

- *Submarine* – Representing the Eastern Naval Command Headquarters, a symbol of India's naval prowess.
- *Visakhapatnam Port* – A major maritime hub and crucial trade gateway.
- *Simhachalam Temple* – A revered pilgrimage site known for its spiritual significance.
- *Vizag Steel Plant* – An industrial giant driving the region's economic strength.

The fusion of these elements on the locomotive's exterior makes it a proud ambassador of Visakhapatnam's essence.

This WAP-7 locomotive was allotted to ELS Visakhapatnam in 2020 from the Patiala Locomotive Works (PLW) and commissioned for service on October 29, 2020. It is equipped with a Siemens Hotel Load Converter and a CCB2 brake system, enhancing its operational efficiency. Its last minor overhaul was completed in January 2025. On February 28, 2025, #39145 was brought into the shed for its Intermediate Overhaul (IOH) at the M7 Bay of ELS Visakhapatnam. A plan was initiated to create a new livery for this locomotive. Quotation was finalized and the paintwork began at the shed. The locomotive was officially released on March 25, 2025, at 15:00 hours after successful maintenance and completion of a load test.

On March 26, 2025, the flag-off ceremony was conducted at Visakhapatnam Railway Station by Shri Lalit Bohra, DRM Waltair, along with other divisional department heads and shed officials. Following the event, the locomotive was coupled to the 18464 *Prasanthi Express* for operating the train from Visakhapatnam (VSKP) to Bhubaneswar (BBS) Railway Station leg of its journey.

A Collaborative Effort:

This locomotive, #39145, wouldn't be here without some amazing people. I owe a huge thank to Sr. DEE/TRS/VSKP and DEE/TRS/VSKP Sri Dev Sahu from Visakhapatnam ELS – they led the way and turned my dream into reality. The team at Visakhapatnam ELS, along with our PCEE/ECoR/HQ Sri Alok Sahay and CELE/ECoR/HQ Sri Sauravmoy Bhattacharya at East Coast Railway, worked hard too, ensuring every detail was perfect. To me, this wasn't just about painting a locomotive – it was about putting all the love and effort into it and I can see that in every detail.

Onward with Pride:

With every mile it covers, the 39145 Visakhapatnam WAP-7 reinforces the spirit of Indian Railways, uniting the past, present and future through the power of electrification. This locomotive is not just a mode of transport; it's a chariot of victory, a testament to teamwork and a celebration of heritage.

Here's to a century of progress and many more to come!

- Anamitra Bose *(covering SCR initiatives)*

:: The Initiatives of SOUTH CENTRAL Railway ::

- ***Initiative by Lallaguda Electric Loco Shed***

Lallaguda, the premier electric locomotive shed of South Central Railway is always a pioneer when it comes to

Images courtesy: SCR Railfans

innovations and craftsmanship. On this all-important occasion, Lallaguda stepped up the ante as the railway enthusiasts provided them with excellent ideas to work upon. The first locomotive to be wrapped in a beautiful Red-white livery was BLW assembled WAP7 #37442. The Locomotive body has 4 mural paintings of four famous places of cultural and historical significance as Kakatiya Kala Thoranam from Warangal, Ramappa Temple from Mulugu, Charminar from Hyderabad and Ajanta Ellora Caves from Aurangabad. The first three places come under Telangana and the last one under Maharashtra. All four of them come under the jurisdiction of South Central Railway. In both sides of the locomotive, the centenary logo by Railway Board was placed in the centre of the locomotive.

The second one to get draped in artwork was PLW assembled WAP7 #39147 in a Red and Blue livery. The sites of geographical, cultural and historical significance were all from Andhra Pradesh this time which included the Veerabhadra Temple from Lepakshi, Gandikota Canyon on river Penna in Kadapa district, Dowleswaram Barrage on Godavari river in Rajahmundry and Dhyana Buddha statue of Amaravathi.

Images courtesy: Team TrainTrackers

The initiative would have been impossible without the concept and efforts of SCR Railfans and with the support of railwaymen from the Lallaguda ELS.

- Sripad Ullas & Nishay Shetty *(covering SWR initiatives)*

:: The Initiatives of South-Western Railway ::

In the sea of initiatives among other zones on the occasion of the CENTENARY YEAR of ELECTRIC TRACTION, South Western Railway was not to be left behind. Though electrification reached the interiors of South Western Railway quite late, it didn't take much time for the marvelous electric runners to rule and it was mostly the three phase modern beasts which began to dominate the tracks within the zone. The premier diesel locomotive shed of the silicon valley of India, Bengaluru was allotted the first electric locomotive in 2019 as in the form of WAP7 #30576 named 'Chamundi'. Later, some more WAP7s were transferred from Royapuram and soon new WAP7s were allotted directly to Krishnarajapuram. After WAP7, WAG9HCs were also allotted for goods outage. On the other hand, the first diesel locomotive shed of India built exclusively to home General Motors HHP locomotives in 1999 –Hubballi, was allotted WAG9s in 2022. Both the locomotive sheds decided to paint some of their locomotives in attractive liveries and designs to celebrate the centenary year of electric traction in Indian Railways in 2025.

• *Initiative by Hubballi Diesel Loco Shed*

The Hubballi DLS had a new beginning when it began to home electric locomotives. #37693 happens to be the first WAP7 of the shed which was commissioned on 23rdApril, 2024 and is equipped with Bombardier Transportation made IGBT Propulsion Kit along with Autometer Alliance Limited made HOG Converters. The locomotive was initially allotted to the Krishnarajapuram Diesel Loco Shed and was later transferred to Hubballi Diesel Loco Shed. After arrival of the locomotive in the shed, I had given a proposal to christen it as '**Bhadra**' as Krishnarajapuram already had 'Tunga' in their fleet as 'Tunga' + 'Bhadra' forms the iconic and beautiful Tungabhadra River of central Karnataka. The nomenclature indicates the unwavering partnership between Krishna-rajapuram and Hubballi in the purpose of serving the South Western Railway. We are grateful to CELE / SWR for accepting the proposal for naming of this locomotive.

After the naming part, it was time for some eye-catching livery to be imparted on a locomotive. The locomotive chosen was #37823 assembled by BLW which was painted in a base colour of white to prepare a canvas. On the faces, a green and grey colour combination was given and proper taping was done to ensure the paint does not ingress into the canvas. Actual painting started after this by the shed artist Sri Asim Banerjee. The theme chosen was Mera Bharat Mahan to celebrate the cultural and historical heritage of India as well as the achievements in several sectors. Popular

Images courtesy: Nischay Shetty

Images courtesy: Sripad Ullas

places like Qutub Minar, Howrah Bridge, Taj Mahal, Gateway of India, Meenakshi Amman Temple, Konark Temple, Sanchi Stupa were painted on the locomotive. Apart from this, several dance forms like Kathakali, Katthak, Bihu, Folk dances were imprinted on the locomotive. Festivals like Pongal, Makara Sankranti, Onam, Baisakhi are also beautifully highlighted. Lastly, India's achievement in cricket and athletics were also recreated on the locomotive. After the paintings were completed, black borders were given between each mural so that the artworks are given a three dimensional effect. The locomotive was rolled out on 25th February 2025.

• *Initiative by Krishnarajapuram Diesel Loco Shed*

Like Hubballi DLS, KJM also had a new start to its career, a few years ago when it started homing electric locomotives. We planned a livery for dedicating and celebrating '100 Glorious Years of Electric Traction (1925-2025)' and WAP7 # 37368 was nominated by the shed as it was in the upcoming IOH schedule. The loco arrived shed on 25th February, 2025. After detailed planning on the drawing board, we decided that Karnataka's rich culture and famous places were to be showcased on the locomotive under the theme of 'Enchanting Karnataka'. It was to be hand brushed instead of being completely spray painted. After preparing the blueprint of the design, we started spray painting the sky-blue background over the roof and top surface. Rough layouts and taping were applied for demarcating the boundaries. After efforts spanning a good 25 days, the painting was successfully completed showcasing the rich culture and history of 'Namma Karnataka' which included 10 famous places and 3 Dance form postures as below.

Places –

- Bengaluru Palace
- Mysuru Palace
- Bengaluru Vidhana Soudha
- Darpanasundari & Chennakesava Temple (Belur)
- Jog Falls (Uttara Kannada)
- Golgumbaz (Vijayapura)
- Virupaksha Temple (Hampi)
- Gomateshwara Temple (Shravanabelagola)
- Lalbagh Garden,Bengaluru (Showcased with Tricolour)

Dances – Dollu Kunitha, Somana Kunitha, Yakshagana

We express our sincere gratitude to the painters for pulling off the livery. We also want to thank the staff of the KJM Shed for providing immense support throughout the project.

- Rahul Nivascar *(covering Southern Railway initiatives)*

:: The Initiatives of SOUTHERN Railway ::

The Southern Sheds of the nation under the purview of Southern Railway have been the chief protagonists for showcasing their initiatives for commemorating any significant events – be for observing Republic Day or Independence Day or any other occasion. Thus, it is apparent that Southern Railway would undertake démarches for commemorating the Centenary Year of Railway Electrification which embodies importance of paramount propositions in the history of railways in India.

• *Initiative by the Arakkonam Electric Locomotive Shed*

The year 2025 marks a historic milestone as Indian Railways celebrates 100 years of electrification, a journey that began in 1925. To commemorate this remarkable achievement, the Electric Loco Shed, Arakkonam (ELS/AJJ) organized a special event highlighting the progress and impact of railway electrification over the past century.

As part of the celebrations, the shed proudly displayed the inscription '100 Years of Electrification 1925 – 2025,' symbolizing a century of dedication and commitment towards modernization and sustainability.

To make the occasion more engaging and educational, local government school students were invited to visit the shed and participate in various competitions. Essay writing and

Images courtesy: Rahul Nivascar

quiz contests were conducted on topics related to railway electrification, its benefits and its evolution over the years. The initiative aimed to create awareness among young minds about the significance of electrification in shaping a sustainable and efficient railway network.

The competitions witnessed enthusiastic participation with students showcasing their knowledge through well-researched essays and actively engaging in quiz rounds. This initiative not only celebrated a century of railway electrification but also inspired the younger generation to appreciate the technological advancements that have transformed Indian Railways.

Senior officials, including Shri C. Dhanesh Kumar, Sr. DEE/RS/AJJ, DEE/RS/AJJ, ADEE/RS/AJJ and Dy. CEE/TRS/Loco, Shri V. Shankar graced the event with their presence thereby encouraging the participants and emphasizing the importance of continuous innovation in railway electrification.

As we step into the next century of electrification, events like these reinforce the significance of sustainable development and technological advancements in rail transport. The team at ELS/AJJ remains committed to promoting knowledge and awareness ensuring the legacy of electrification continues to inspire future generations.

• *Initiative by the Royapuram Electric Locomotive Shed*

As part of the centenary celebrations of electrification, the Electric Loco Shed, Royapuram organized a series of competitions for school students, fostering awareness and enthusiasm about railway technology. Students from St. Peter's Higher Secondary School, Royapuram and Dhanalakshmi School, Royapuram were invited for a practical visit to the shed, providing them with an opportunity to understand the working pattern, maintenance and operations of electric locomotives.

During their visit, the students witnessed the intricate mechanisms involved in locomotive functioning, gaining insights into the various maintenance procedures and safety measures followed at the shed – a firsthand experience for all of them. This hands-on exposure surely inspired the young minds, potentially sparking an interest in railway engineering and technology.

The event was attended by distinguished officials, including Principal Chief Electrical Engineer (PCEE) Shri Somesh Kumar, Chief Electrical Loco Engineer (CELE) Shri N. Balaji and Senior Divisional Electrical Engineer (Sr. DEE/RS/RPM) Shri Naga Sreenivasu Rongala, Divisional Electrical Engineer (DEE/RS/RPM) Shri V. Chellappan and Assistant Divisional Electrical Engineer (ADEE/RS/RPM) Shri Jeyanthand. Staff from the RPM ELS was also present in this event.

In recognition of their participation, students were presented with kits and mementos by the officials, making the event a memorable and the experience more enriching. This initiative by the Electric Loco Shed, Royapuram, underscores the commitment of Indian Railways to educational outreach, fostering curiosity and learning among young students about railway electrification and its evolution over the past 100 years.

• *Initiative by the Erode Diesel Loco Shed*

On a remarkable initiative to mark 100 years of railway electrification, Diesel Loco Shed, Erode (EDDX) organized an educational visit for students of the Railway School, Erode. The event provided a unique opportunity for young minds to gain primary knowledge about locomotive operations and maintenance.

During the visit, students were given a practical session at the diesel loco shed, where they observed various locomotives and learned about their functions and maintenance processes. The interactive session included detailed explanations by experienced railway personnel, allowing students to understand the complexities of diesel locomotives and their role in railway operations.

Following the tour, the students were taken to the

Images courtesy: Rahul Nivascar

Images courtesy: Rahul Nivascar

conference room, where they participated in a quiz and essay competition. These activities aimed to enhance their understanding of railway technology and history while fostering their enthusiasm for learning. The students actively engaged in the competitions, showcasing their knowledge and enthusiasm for the subject.

To commemorate the occasion, a group photograph was taken in front of the iconic WAP-4 #22258 locomotive, capturing the excitement and learning experience of the young participants.

The event saw the august presence of Shri P. Srinivas, Senior Divisional Electrical Engineer (Sr. DEE/RS/EDDX) and Shri C. Ravi Kumar, Divisional Electrical Engineer (DEE/RS/EDDX) along with the dedicated staff of the Diesel Loco Shed, Erode. Their guidance and encouragement made the visit a valuable and memorable experience for the students.

This initiative not only provided students with a deeper understanding of railway operations but also inspired them to explore career opportunities in the railway sector. The Diesel Loco Shed, Erode continues to play a vital role in railway awareness among young minds, making this educational visit a significant step in bridging the gap between academics and practical learning.

All these innovative concepts and ideas from the ferroequinologists duly supported by the concerned officials of our national carrier presented a win-win situation for all as these manifested the vibrant and spirited side of Indian Railways that goes beyond the ambits of earning profits in lieu of providing services.

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Image courtesy: Sripad Ullas

THE FIRST 'MAKE IN INDIA' EMU RAKE

trAnspOrt hObO

Contrary to popular beliefs, the first firm to execute the production of E.M.U.s in India is not Integral Coach Factory in Chennai, but Jessop & Company from Calcutta. Here's a brief look at the days that ultimately culminated in delivering India's first indigenous E.M.U. rakes that started rolling onto the stable of Eastern Railway at Howrah from 1959...

History of Jessop & Co. from their own pages-

The roots of Jessop & Company Ltd. go back to 1788 when Breen & Company was founded in Calcutta. In 1820, Henry and George, sons of William Jessop acquired Breen & Company on behalf of Butterfly Company which was established in Derbyshire, England in 1790 by William Jessop. These two companies merged together to become Jessop & Company. Subsequently in 1973, the company was taken over by the Indian Government and Jessop became a Govt. of India undertaking. In 1986, with the formation of Bharat Bhari Udyog Nigam Limited - a Public Sector Holding Company under administrative control of Dept. of Heavy Industry, Ministry of Industry, Govt. of India, Jessop became a subsidiary of the Holding Company.

Very few are aware but one of [if not the first] India's first electric locomotive to be used by any railways started with East Indian Railway- the predecessor of Eastern Railway, although it was never intended for mainline service. It was built by Cowans Sheldon Engineers from Carlisle and was one of the earliest examples of 3-phase overhead current collection in the first half of the 20th century. This locomotive was designed for shunting duties in specific yards and could run at a speed of 10 mph while hauling 200 tons.

However, actual 'mainline electrification' of the dense railway network around Calcutta took a long time to become a reality

in spite of the fact that one of the very first 'comprehensive' investigation was carried out in 1914 by Messrs. Merz and McLellan justifying electrification on the Calcutta [Sealdah] – Kanchrapara section of the Eastern Bengal Railway. The outbreak of World War I completely derailed this endeavour and although several other investigations were carried out for the same from time to time, it was only in 1953, the next concrete steps were taken. Subsequently, the Railway Board sanctioned the electrification of railway networks around Calcutta.

This time, however, the tides turned towards the other bank – the erstwhile East Indian Railway side or what became, back in 1952, the old Howrah division of the newly formed Eastern Railway. Departing from the then prevailing 1.5kV D.C. traction that adorned both Bombay and Madras suburban sections on broad as well as meter gauge routes respectively, the Howrah electrification project chose 3kV D.C. It was chosen based on the then prevailing systems all over the world which gradually opted for 3kV D.C. over 1.5! 25kV A.C. was still in a nascent stage and not too many systems around the world opted for it in the mid-1950s.

Although the first electric commercial run out of Howrah happened on 1st December 1957, plans were afoot since 1954-55 and orders for Electric Multiple Units [E.M.U.s] were already placed. Three different suppliers – M.A.N/L.H.B./A.E.G. from Germany; S.I.G. from Switzerland and Jessop & Co. from India were eventually chosen where Jessop & Co. was the first to be selected in 1954-55. By May 1955, it was more or less clear that Jessop, who haven't had enough expertise for building E.M.U.s, would not be able to supply the required rolling stocks in time for the first phase of the electrification in 1957. Accordingly, a fresh order for 98 E.M.U. coaches – 32 units [each unit comprising of 3 coaches] and two spare motor coaches were placed with M.A.N/L.H.B./A.E.G. and S.I.G.

However, by the time of the inauguration of E.M.U. services between Howrah and Sheoraphuli on 14th of December 1957 by the then Prime Minister Jawaharlal Nehru, only 8 units of the M.A.N/L.H.B./A.E.G. made E.M.U.s were commissioned while a solitary S.I.G. made E.M.U. unit had just reached Calcutta. The 8 units of the M.A.N/L.H.B./A.E.G. made E.M.U.s were converted into 4 E.M.U. rakes of six coaches each and were used for daily services between Howrah and Sheoraphuli and vice versa.

Although the M.A.N/L.H.B./A.E.G. and S.I.G. E.M.U. rakes were gradually reaching Calcutta from November 1957, the expansion of the electrified suburban section from Howrah towards Bandel and then Tarakeshwar followed by the Howrah Burdwan Chord asked for more rakes to be deployed. The situation was further complicated by the fact that a large number of the existing conventional aging rolling stocks were also in a dire need of replacement. Unfortunately, even though Jessop & Co. was entrusted with the delivery of 104 E.M.U. coaches in 1955-56 – the first of the suppliers to be selected, they came in the picture a little delayed.

The original plan submitted by Jessop & Co. in early 1955 for E.M.U. production was as follows:

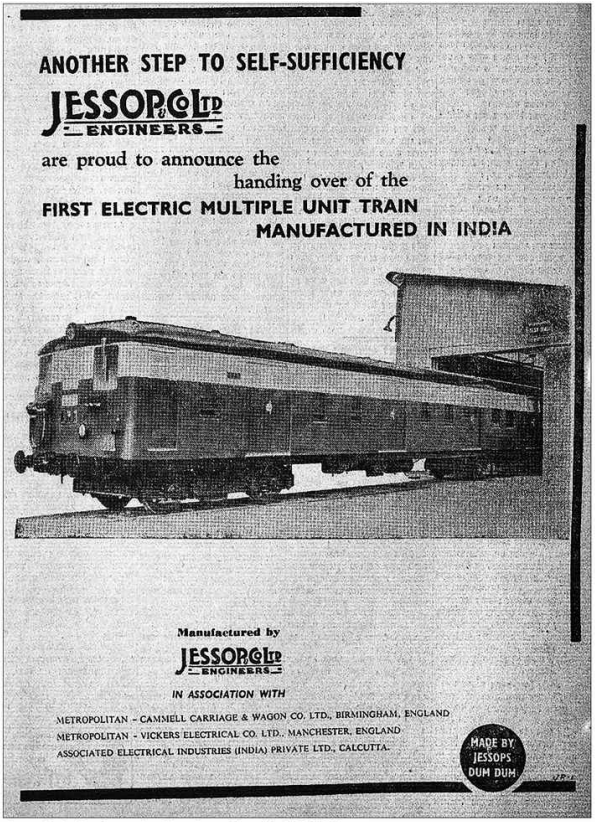
1958-59 - 50 coaches in total with 18 imported motor coaches in complete knocked-down condition and 32 trailer coaches made at their unit at Dum Dum and for 1959-60 to 1962-63 period – in each financial year, 50 coaches in total with a complete in house production at their Dum Dum unit.

It is interesting to note that the original order for the initial 104 E.M.U. coaches for Eastern Railway placed with Jessop & Co. "stipulated that delivery should commence from November 1957, at the latest and be completed by October 1959" – the exact month on which instead of the E.M.U. rakes made by Jessop & Co., the M.A.N/L.H.B./A.E.G. made E.M.U. rakes arrived at the Calcutta Port.

The quotation for each of the 104 E.M.U. coaches was submitted by Jessop & Co. on 30th December 1954 and was accepted by the Railway Board in early 1955. Each of the E.M.U. motor coaches from Jessop & Co. was pegged at Rs. 6,13,600/- while the trailer coaches were priced at Rs. 2,92,600/-. These costs were for either a fully furnished, fitted with electric traction equipments motor coach or a similar trailer coach. The total price for 50 coaches [18 motor coaches and 32 trailers] for the first year of production was Rs. 218,51,990/- and the provisional total for balance of 54 coaches [18 motor coaches and 36 trailers] was projected at Rs. 215,78,400/-

These costs included not just the production but other associated expenditures including electrical as well as mechanical spares, relevant electrical and mechanical tools and brake testing apparatus. These costs were subject to further rebates as well as taxes which were adjusted in due course of time. For components, materials and mechanical parts for the E.M.U. coming from the U.K., the price was subjected to cost difference depending on price variations based on the British Electrical & Allied Manufacturers Association, British Board of Trade for Electrical Engineering Industries and the British Board of Trade for Mechanical Engineering Industries. On top of this, there was the sea freight rate that was adjusted according to the then concurrent rates for each of the deliveries. On the other hand, no price variation was allowed for all the work carried out within India.

Jessop & Co. collaborated with M/s Metropolitan Cammell Carriages & Wagon Co., Limited, U.K. for mechanical portion and M/s Metropolitan Vickers, again from the U.K. through Associated Electrical Industries (India) Limited for the electrical parts. These two were considered as Jessop & Co.'s sub-contractors. The underframes and body shells were assembled at Jessop & Co.'s Dum Dum works and electrical equipments were fitted before fully furnishing each coach for the first lot. Jessop & Co. themselves supplied supporting steelworks, inductive diverters, motor generators, batteries, compressors, air piping as well as conduits, protection



Jessop first rake ad - courtesy Jugantar archives, The British Library.

plates, insulators and inspection cat-walks for the pantographs on the roof.

The delivery of the E.M.U. rolling stocks from Jessop & Co. was decided to be at the rate of four 3 coach units per quarter, meaning 2 E.M.U. rakes as the initial E.M.U. rakes in Howrah division was all of 6 coaches. A 6 coach E.M.U. made by Jessop & Co. comprised of 2 units- each unit

An incoming Jessop EMU rake [next to the then brand new EMU CS] on the then HBM down fast line [present day down mainline]. Courtesy - A screenshot from an FDI documentary.

This picture was taken from the Chandmari Bridge with a departing Jessop EMU rake on the then HBM up line [present day up mainline]. Courtesy to its respective owner

housing one motor coach and two trailer coaches. All electrical and mechanical spares were supplied together with the first units.

The design and manufacture of the coaches were made while strictly adhering to the designs and drawings prescribed by the Railway Board. Initially the luggage compartment was included in the motor coaches but was later shifted to one of the trailer cars to restrict the axle load of the motor coach to 17.5 tons or less. Westinghouse brake equipment was used in the E.M.U.s with 4 brake cylinder per motor bogie truck and 2 brake cylinder per trailer bogie truck. For the electrical equipment, the type 2524 traction motor from Metropolitan Vickers was used. The floor height from the rails was slated at 3' 10.25" in tare condition. Interestingly, a hand operated pump was provided for the raising and lowering of the pantographs. These Jessop & Co. made E.M.U. rakes were made compatible for coupling with other makes in case of need. An inter-coupling test with M.A.N/L.H.B./A.E.G. and S.I.G. made E.M.U. rakes was also carried out at Howrah E.M.U. carshed although the results of which are unknown. All the special tests including strain gauging, head-on loading including all other measurement tests for at least one fully complete E.M.U. unit were prescribed to be carried out in India.

None-the-less, after a bit of a dilly-dallying which resulted in a delay of about a year and a half, the first 'make in India' E.M.U. rake was handed over to Eastern railway on 6th June 1959. The event was presided by the then Railway Minister Jagjivan Ram who while speaking on the occasion, mentioned that such endeavour in India proves that everything is possible in this country and if given a chance [in the world arena], India will prove its mantle!

And India, did just that, not just through Jessop & Co., but, within the next few years, through Integral Coach Factory and other production units but that's a story for another day!

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VERDANT RAILS

THE TRUE HUE OF INDIAN RAILWAYS' GREEN ENERGY

Charting a Green Course is Easier Said Than Done

Somsubhra Das

2025 has been earmarked as the year of milestones, especially from railway perspective. The most significant among them is perhaps being the Centenary Year of Electric Traction in our country. Electric Traction, the most favoured option of late, is no longer limited to the essential golden quadrilateral routes crisscrossing the railway network; in fact, it has invaded all the trunk routes and connecting routes with equal precision. The frantic and fanatic pace of Electrification humbled the last bastions of 'Diesel Frontiers', often defying logic and sense. 'Mission Raftaar' has truly been executed in case of electrifying the broad gauge (BG) routes rather than enhancing the overall average speed of trains across the nation. Thus, India could not quite become the Promised Land for speed merchants advocating faster commute by trains. 'Electrification', identified as a potent tool for the said purpose, has ensured cutting short the Diesel Raj in Indian Railways – absurdly and abruptly in certain pockets of the State which is deemed to be a quite an unnecessary exercise. As a result of this wild pursuit, the latest Press Release by our national carrier announced about bringing 98% of the BG routes under the wires – many sections of which carry a couple of daily trains only and that too without any substantial or no freight movements. Now, the reason behind investing in a 22kV AC 50Hz wiring for only a couple of daily services can be best explained by the men running the system.

The criteria that have played a pivotal role behind this expeditious rolling out of electrification can be attributed to reduced dependency on fossil fuels and decreased diesel consumptions implying lower carbon emissions. But electricity fed to the grids for onward transmission to traction substations is still very much dependent on the traditional power sources like coal. This culminates the fact of overreliance of Indian Railways on another form of 'fossil fuel' which also adds to the environmental pollution, in some way or the other. Our national carrier's exploration of renewable energy sources like solar and wind power to supplement the grid supply is a distant dream. Thus, Electrification is not exactly that Green as is proclaimed and promulgated.

Electrification, touted as 'Green Energy', often acts as a double-edged sword involving a compulsive mass felling of trees along its alignment with near zero replantation or translocation, thereby further impacting the environment in a negative way without any counterbalance. Yes, factors like 'Regenerative Braking', 'Better Haulage' of heavier freight and longer passenger trains at a higher speed implying improving the overall operating ratio definitely works in favour of

electrifying the network but are these the only realities that meets the naked eyes! The answer is a resounding 'No'. The compulsive tie-up of Electrification with Speed is nothing but a misrepresentation of truth. Testing of Talgo coaches with a WDP4 locomotive hitting 160 kmph in trials tells a completely different story, thereby busting the Speed Bubble of the electric locomotives. To add to the scheme of things, HOG was tried out on some HHP Diesels as well but discontinued for reasons best known to the policy makers. Also consider the maintenance costs of the entire electric system which are on the higher side than usual questioning its utility in the routes with lesser and sparse traffic.

Referring to traffic, the Dedicated Freight Corridor (DFC) has perhaps been one of the best infrastructural developments, post-independence, that has really put India on the fast track of freight movements. All the arms of DFC is entirely electrified, yet one can spot GE Diesels along with their EMD counterparts still taking to the tracks in large numbers despite a bountiful turnout of Electric Locomotives across the CLW, BLW and PLW Units. Isn't this baffling and a self-contradictory approach to say the least? The paradox does not end here as the country has started foraying into the nascent world of Hydrogen fuel propelled trains – a clear conflicting stand which can be best described as 'Eccentric Electrification' vs 'Hydrogen Hysteria'.

Worldwide, the initial boom of using hydrogen as a substitute for fuel in railways is seeing a steady decline. Germany – the pioneer of hydrogen-powered fuel cell trains has already bitten the dust. Some German states like Lower Saxony, Hesse and North Rhine-Westphalia have borne the brunt of Hydrogen Hysteria thereby labelling the French rail giant Alstom manufactured hydrogen trains as unsuitable for the future requirements with zero reliability in the local rail passenger transport sector. Another German state Baden-Württemberg had summarily rejected the overblown claims about hydrogen being a clean energy solution as a fuel source. The overly optimistic claims about branding hydrogen as a 'miracle technology' or a 'silver bullet' for decarbonization are not entirely accurate. Electrolytic

Diesel powers flexing their muscles under the wires in WDFC

Initiatve of Alternate Fuel Powers - CNG powered DEMUs

hydrogen production is energy-intensive and can be a significant energy consumer. Also, hydrogen trains would cost about 80% more over their lifetime than battery-electric and overhead wire powered trains due to their maintenance nightmares.

Despite the obvious drawbacks like high production costs, infrastructure development along with storage and transportation complexities which include potential for worsening climate pollution, if not managed properly, certain countries including ours have jumped the bandwagon. The sudden injection of public funding for hydrogen projects implying a tendency to overemphasize the benefits of hydrogen without fully acknowledging its limitations and potential downsides, can itself lead to unrealistic expectations and hinder a more balanced approach towards achieving clean energy goals. Thus, the 'Hydrogen Hope and Hype' will see a few more victims like Foshan in China where a hydrogen-powered tram found itself relegated to rusting its way to doom. Daejeon city of South Korea may soon join this abysmal atrocity with her set of Hyundai Rotem made hydrogen fuel cell trams along with Italy and the four French

Some of the experiments in shunting locos - Bio-diesel & Battery operated locos

regions Auvergne-Rhône-Alpes, Bourgogne-Franche-Comté, Grand Est and Occitanie who have ventured out on dual-mode train sets powered by electricity and hydrogen from Alstom. In the other part of the world, the United States and Canada have quietly restricted the 'Hydrogen Hard Truths' to the limits of trials only.

Coming to India, the trial runs of the first hydrogen-powered train manufactured by the Integral Coach Factory (ICF) has commenced on the Jind-Sonipat route of Northern Railway. The train is acclaimed to be equipped with 1,200 horsepower engine which is a record-shattering global benchmark and is designed for an operational speed of upto 110 kmph while carrying up to 2,638 passengers. This technological leap is aimed at India's 'Hydrogen for Heritage' programme that involves investment of ₹ 2,800 crores for hydrogen fuel cell-based train development with an additional ₹ 600 crores for hydrogen infrastructure development for 35 planned trains and heritage corridors. With all these positives being widely ballyhooed by the media to colossal proportions to outweigh the practical implications and challenges, this stance of the railways to go big on the hydrogen propelled trains at this juncture, simply looks like a recklessly bold and foolhardy move that brings with it a gamut of questions –

If Hydrogen fuel propelled trains are to be considered as the future with such hefty investments, then why go for cent percent electrification at all?

If Hydrogen power is going to sky rocket the country's transportation prospect, then why invest in Bullet Trains?

If Hydrogen is set to rule the future, then why consider Hyperloop and put public money at stake?

Well, the answer is always along the expected lines emphasizing on all around technological advancement with optimal utilization of resources at your disposal with a 'Make in India' branding, though the fuel cells wearing 'Danke, Canada' stickers spoils the party somewhat! Still, such explanation does not shy one away from the obvious question of opting for this fancy exercise despite being aware about the despair of the developed nations over hydrogen-powered trains or hydrails for their near total failures! Why no heed has been paid over factors like energy-intensive production, extortionate installations and hazardous handling of hydrogen for as select number of targeted services!

India's proclivity for Green Energy in transport sector does not end here. The country has moved a step further – it is exploring the vista of nuclear power by looking beyond the horizons of hydrogen fuel. The national transporter has begun talks with the Department of Atomic Energy (DAE) for establishing small nuclear power facilities to meet its energy needs which include setting up of small nuclear power plants. The Indian Railways Finance Corporation (IRFC) has been pressed into action to secure funding for these initiatives where the Indian Railways will provide land and guarantee power consumption while the DAE and the power

India's first Hydrogen powered prototype rake under trial on the Jind-Sonipat route. Courtesy: Fuelcellworks.com

ministry will look after plant establishment aspects with fuel supply agreements. An allocation of Rs. 20,000 crores for **Nuclear Energy Mission** have been announced to fuel the project which aims to implement a minimum of five domestically developed Small Modular Reactors (SMRs) by 2033. IR has got in touch with the Nuclear Power Corporation of India Limited (NPCIL) and power ministry regarding nuclear power allocation for the railway system. In a statement issued recently, it has come to the fore that energy requirement for Indian Railways may go upto 10 GW by 2030 of which the national carrier aspire to purchase 3 GW of renewable energy along with 3 GW of thermal and nuclear power by 2030. The additional 4 GW required for traction will be procured through arrangements with power distribution companies.

Indian Railways' strive for alternative sources of energy, especially on the nuclear power front, is not a new development though. Back in 2016, IR had initiated preliminary talks regarding a collaborative venture for nuclear power plant establishment which didn't make any substantial progress for lack of fund. But with the low-carbon strategy in place coupled with Net Zero Carbon Emission Target, India has taken the drive, once again. But there are grave implications with far reaching effects in this field too as the safety challenges involved surpasses all other factors. The use of thorium reactors may be considered for their relatively low radiation risk but the radiation risk still remains low, not nil which implies adequate shielding to protect passengers and crew. Then there are technical complexities and high initial costs for developing and implementing nuclear-powered trains. Before committing itself to this project involving 'High Risk and High Cost' for the sake of diversified energy sources, some groundwork regarding the erstwhile Soviet Russia's dropping of plan for nuclear-powered trains in the early 1950s should have been reckoned. A leaf could have been taken out from the book of SNCF, the national railway company of France which runs its electric locomotives by utilizing power from grid that are fed by nuclear power along with other sources – not directly from on-board or trackside nuclear reactors.

All these approaches manifest that IR is standing at the crossroads of dilemma and conundrum where logic and rationale have been sent for a toss. Between claiming success and achieving one, there is still many a slip between the cup and the lip. This reminds us of the infamous inflated claim of Guwahati station being the first entirely solar powered station of the country which later turned out to be a false dictum with the actual figure iterating it to be powered by 20% solar energy only. Thus, IR has now got entangled in a delirium from which it can't break free resulting in press releases dwelling on showbiz in science and technology rather than focusing on real progress. Despite all the media centric hoopla around Hydrails, Hyperloops, Atomic Trains and Bullets, we cannot but help admit that a Vande Bharat plying at 130 kmph on select patches still remains our best bet. All the high-speed alternatives on offer, on paper, has not exactly have enthralled the nation. These initiatives, at least for now, cannot fulfill the 'decarbonization goals' by any stretch of imagination and we should stop indulging in acts of sheer follies where electrification of routes running two daily services are justified under the aegis of Green Energy, investing in half-baked technology of Hydrails with no brighter prospect and identifying of lands for setting up SMRs to feed the futuristic Atomic Trains are highlighted as the immediate future of rail transport. Bravo!

There is no denying the fact that IR needs to bank on the alternative sources of energy for its survival but it also needs to free itself from the disillusioned press releases that uphold fledgling measures as global achievements without even going into the pros and cons of matters. Instead of engaging in more promotional activities, IR should call for more investments on harnessing renewable energy resources like solar energy and wind energy among others to such extent that it becomes self-reliant in the truest sense thereby eliminating carbon footprints at a maximum permissible speed!!

Let's stay true to our pledge of achieving Energy Independence by 2047 and Net-Zero Goals by 2070 which implies decarbonizing our economy by significantly cutting down on greenhouse gas emissions with simultaneous abstinence from import of crude oil and coal. All these goals can only be attained if synchronized tapping of the entire potential of renewable energy goes on along with continuous exploration of ways for finding cheaper means of green hydrogen production and augmentation of the power grids with nuclear energy extracted from safer sources. We are yet to arrive at a time when we can set true global benchmarks in eco-friendly transportation sector that will present our future generations with a cleaner and more efficient rail system propelled by renewable energy. Let a pragmatic approach endorse the **National Green Hydrogen Mission** and **Nuclear Energy Mission** before gate crashing the world with a Hydrail or an Atomic Train plagued by technological snags and imbalances coupled with environmental hazards.

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Acknowledgements :

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A STATION UNLIKE OTHERS

Shourya Basu

The author is at present working as a research scholar in the field of Heritage Railways and Tourism at Indian Institute of Tourism and Travel Management which operates under Jawaharlal Nehru University, Delhi. He is fascinated by railways since childhood and likes undertaking offbeat rail journeys – all thanks to his grandfather, who was also a rail enthusiast. Besides all these activities, the author also works on the tramways in Kolkata.

There exists a railway station with a single platform, three tracks, two manned level crossings in the vicinity, a platform shed, a waiting room, a toilet complex, some railway buildings and a temple just outside its premises. The station is staffed by a station superintendent, a station master among a few others who serve as signalmen and flagmen. It also features a refreshment stall that serves piping hot tea and snacks. On weekdays, four trains stop here daily. During weekends, the number rises to six. Everything seems perfectly ordinary, isn't it?

But, what if, I tell you that this station lacks one of the most crucial features of any railway station- 'Passengers'!

That's right. No passengers use this station. Ticket sales are consistently zero, so the ticketing system is kept in 'flight mode'. This is because the station lies within a national park which also happens to be a tiger reserve. Yes, I am talking about 'Dudwa Station' located

on the Nanpara – Mailani metre gauge route under Lucknow Division of the North Eastern Railway. The only people who use the station are the railway staff and occasionally a few individuals from the nearby office of the Forest Ranger who, in any case, don't require buying tickets for obvious reasons. Since it is located deep within the Dudhwa National Park which also houses a part of the Dudhwa Tiger Reserve, there is literally nowhere to go after alighting from a train. (It is to be noted that Indian Railways uses a slightly different spelling of the station with the ones used by the Forest Department). There used to be railway quarters beside the station, the buildings of which still stand today. Families of railway workers once lived there, but they were relocated a few years ago to Palia Kalan, the next station on the route which is a bustling town.

Dudwa Station was opened in 1890 as part of the Mailani – Palia Kalan – Kauriala Ghat section. At the terminus, passengers could once take a ferry across the Ghaghra River to reach Katarniya Ghat Station, from where they could continue their journey to Gonda. The station was originally built to support the flourishing logging industry in the region as the railway used to transport wood and timber. Later, Dudwa became a junction for two branch lines leading to Gauri Phanta and Chandan Chowki, both border villages near Nepal. At its peak, the station bustled with passengers, either involved in the logging trade

or transferring between the branch lines and the main line. In 1973, a barrage was constructed across the Ghaghra River, complete with a road and railway track connecting Kauriala Ghat and Katarniya Ghat stations. This development allowed trains to run continuously from Mailani to Gonda via Dudwa, Tikunia, Nanpara, and Bahraich.

However, the scenario dramatically changed later. The area was already declared a wildlife sanctuary by the government of Uttar Pradesh in 1958 for protecting the then quickly declining swamp deer population followed by an upgrade to a national park in 1977 with inclusion of additional areas thereby effectively ending the logging industry. This led to a sharp decline in railway traffic and passenger count

as the park was later declared a tiger reserve in 1987. The station continued to function as a junction until 1994, when the branch lines to Gauri Phanta and Chandan Chowki were closed, taking away the last of its regular passengers.

Dudwa was spared from the gauge conversion that affected other parts of the route, due to concerns raised by the Forest Department. Construction activities along the railway alignment were restricted as the line passes through two protected areas — Dudhwa National Park and Katarniya Ghat (Katerniaghat) Wildlife Sanctuary. As a result, only the Nanpara–Mailani section still operates on metre gauge, while the rest have been converted or are under conversion to broad gauge.

Despite its dwindling utility, Dudwa Station remains operational as a block station with crossing and signaling facilities. Technically, you can still buy a ticket to or from this station — but hardly anyone does.

What remains, however, is the serene and untouched beauty of the forests encapsulating the station. For rail enthusiasts and anyone in search of peace and tranquility, Dudwa is a hidden gem. And if you do happen to visit, don't forget to buy a snack or two from the sweet old grandfather who runs the refreshment stall since 1967 and is not only the station's sole resident but also a living encyclopedia of its rich and forgotten past.

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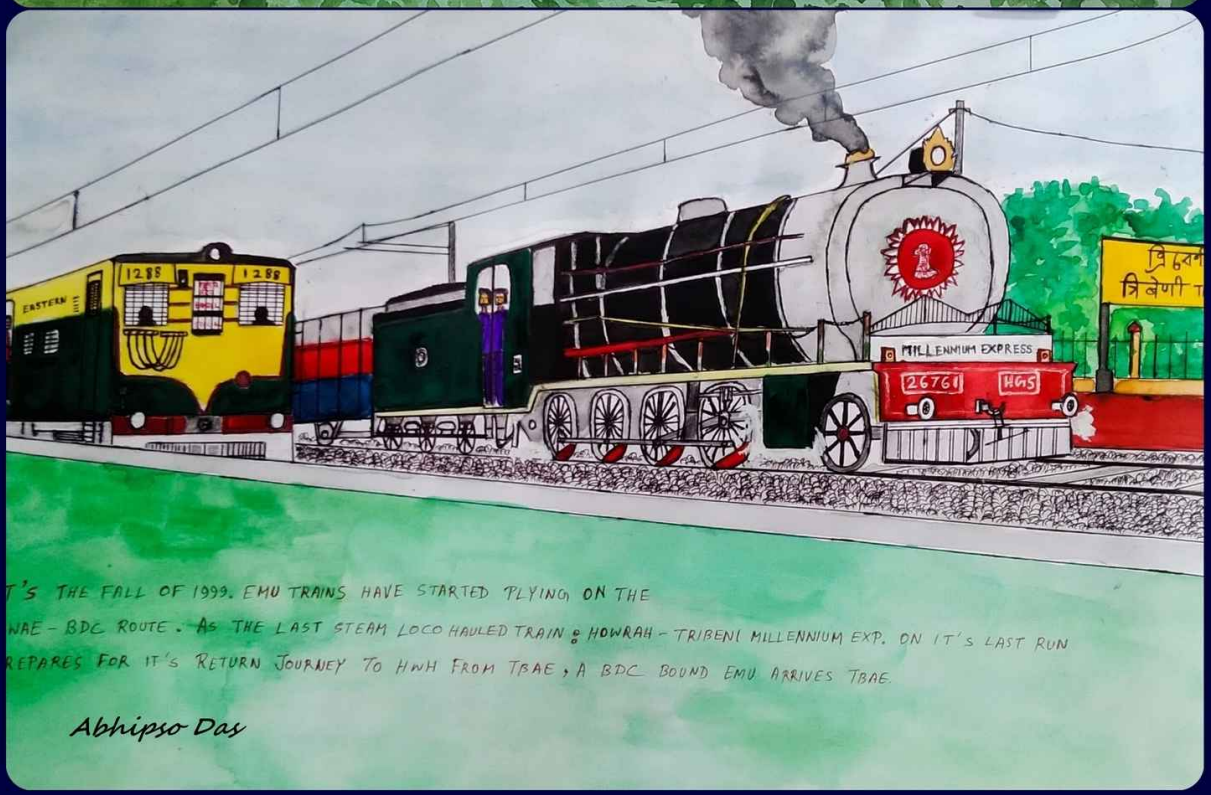
Railway Sketches

Abhipso Das



T'S THE FALL OF 1999. EMU TRAINS HAVE STARTED PLYING ON THE
WAE - BDC ROUTE. AS THE LAST STEAM LOCO HAULED TRAIN ; HOWRAH - TRIBENI MILLENNIUM EXP. ON IT'S LAST RUN
REPARES FOR IT'S RETURN JOURNEY TO HWH FROM TBAE, A BDC BOUND EMU ARRIVES TBAE

Abhipso Das

Veiled in Vapour

World Heritage Day Celebrations at Rewari Steam Shed

Somsubhra Das

The month of April has significance of highest order as far as our national carrier 'Indian Railways' is concerned. While 16th April marks the day of chugging of the first passenger train in India signifying the introduction of railways, 2 days later, i.e., 18th April, though not exactly the same year, is observed as the World Heritage Day worldwide. Railways has been one of the vehicles of our social transformation and advancement through all these 172 years of its existence which has also made it the custodian of India's rich heritage, great legacy and cultural tapestry. Aptly, Indian Railways (IR) celebrates World Heritage Day at two of its most prominent Heritage Museums in the National Rail Museum (NRM) at the capital and at the Rewari Railway Heritage Museum (formerly the Rewari Steam Locomotive Shed). We will however, limit our discussion to this year's activities that took place in the later.

As they say, "Things will happen when they are destined to happen", on the morning of the 18th April, I was sitting on a bench on the platform of Delhi Sarai Rohilla awaiting loco attachment of bi-weekly Sikar Express when an old ally crossed my path – Anmol Ezra Shah. Anmol has been a dear friend of mine who has spent more hours at the Rewari Steam Shed than on tracks. We immediately struck up a conversation during which he revealed about the programme that was set to unfold at the Steam Shed as I was completely oblivious about the iconic day implying a total unawareness about such event. But fate would have other plans as it already had suppressed my original itinerary by booking my presence at the event!

We made our way to the Shed by spotting trains enroute. Rewari is well known as one those venues in the country where one can witness double stack container trains. My initial intent included spending a day there which has become a routine of sorts for me during my every visit to the capital or its vicinity. But this time around, I had to throw every plan out of the window after Anmol briefed me about the firing up of 'Chotu'. Now, who is Chotu?

From my 4 previous visits to this place what I could made out that Chotu must be the latest addition to the repertoire of steams that the iconic shed has managed to hang on to. And my thoughts got vindicated once I stepped inside the Shed. So, by Chotu, as nicknamed by some Railfans, I mean

The newest sensation of Rewari Railway Heritage Museum *Image courtesy: Rudranil Roy Chowdhury*

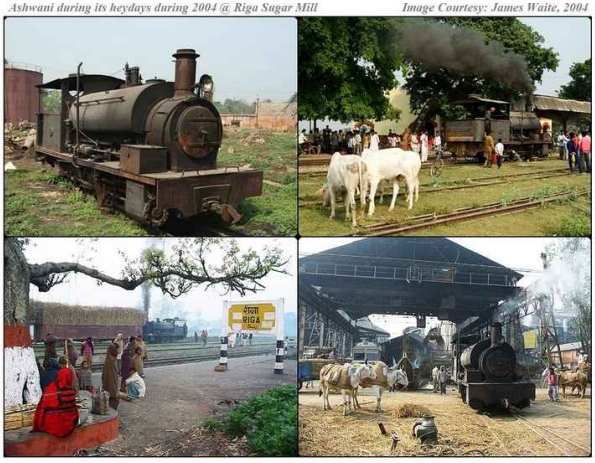
The Foreman with his new favourite machine

'ASHWANI' – the Meter Gauge Steam Loco, built in 1930 as the No. 1644 by the Hudswell Clarke Co. Ltd. of Leeds, England. It was earlier owned by the Riga Sugar Company Limited located at Sitamarhi in the Central Provinces, later Uttar Pradesh and used to haul sugarcane wagons from the main line to the factory during her hey days. This latest recruit is a 0-8-0 Saddle Tank one and was christened as ASHWANI after it was brought at its new home where she also got a new lease of life. The dimensions of Ashwani justified her nick name as the locomotive is not exactly a broad-gauge behemoth.

Ashwani was donated by the Riga Sugar Company Limited and had been in service since 1934 to 2010. It arrived Rewari Steam Shed on the 16th of February, 2021 in non-working condition. However, it underwent rigorous restoration work at Rewari Heritage Steam Shed itself to get back to life in March, 2022.

Steaming up a vintage locomotive is no cake walk. It takes hours to get her ready. This allowed us to take a look at the other exhibits once more after a formal meetup with the Foreman – Mr. Rahul Bharadwaj. Mr. Bharadwaj turned out to be person with keen interests in railways beyond the purview of his duties – seldom we come across such young and enthusiastic railwaymen these days. He is also a keen listener and a true gentleman to the core. After discussing over our favourite subject and loitering amidst historical machines, in about two hours' time, it was lights, camera, action!

Ashwani during its heydays during 2004 @ Riga Sugar Mill *Image Courtesy: James Waite, 2004*



Ashwani has already been steamed up and the man in charge of the steam had also arrived by now and it was none other than Mr. Ravinder Kumar – the pilot who was at the wheel of the Fairy Queen during its last Heritage Run in February 2023! Mr. Kumar hails from Delhi Division of Northern Railway with an experience of serving IR for more than 25 years. A known face doubles the joy and jubilation as frequent requests to Mr. Kumar for opening the firebox lid to watch the glowing fire in the belly of the engine saw him oblige with a smile. Finally, it was all set after a thorough check of the pressure built up along with various parameters which would set the loco running.

The hoot and the hiss from the engine had started reverberating the shed as plumes of emitted smoke added to the ambience. It reminded of my childhood days when I used to witness scenes like this. It seemed like pure nostalgia as

The burning coal from the belly of # 1644


ASHWANI
1644
YG(P)


ASHWANI
1644
YG(P)

The World Heritage Day Banner on No. 1644

The Toots & The Hisses....

an MG Steam Locomotive puffed out smoke while chugging along the track. The reciprocating motion involving the back-and-forth movement of the pistons, the smell of the burnt coal along with the frequent blowing of whistle transported us to those days when steams used to cloud the blue skies with dense smoke emanating from them.

Apart from a handful of brisk movements which can go upto a maximum speed of 40 Kmph, Ashwani was assigned a 'duty' as well. YG 3438 aka 'Sultan', a namesake of the original one, had to be moved a couple of yards for facilitating restoration work and this task of moving the Goliath (Sultan) was assigned to David (Ashwani). Chotu pulled off the assignment with great success despite of its short stature. The initial hiccups due to the jammed wheels of *Sultan* were overcome with much precision and eloquence as everyone enjoyed this success with great fanfare.

The activities ended for the day with customary photograph of the entire team of the Rewari Steam Shed posing in front of one of its prized possessions. Overall, it turned out to be an action-packed day with many positive takeaways. I truly experienced a magnum opus of a living heritage which is unlike walking past some dead exhibits from bygone era. For Chotu, it is very much alive and kicking! For us who were present, it was celebrating World Heritage Day with a 'Living Heritage'.

The Rewari Steam Shed Team

Coming to the flip side of the 'event', publicity, or the lack of it dwarfed the event as only half a dozen of tourists could watch this astounding performance, that too, by chance. This celebration of 'World Heritage Day' by the Indian Railways highlights the rich cultural and historical heritage of railways in our nation. Although IR makes conscious efforts but what is now needed is aggressive publicity to make the commons aware and sensitize them about such events which may see a huge surge of visitors ultimately filling the coffers as well. Events like these must be aimed to promote tourism and raise awareness about the importance of preserving India's cultural legacy. Wide publicity will auger well for such initiatives without which even successful hosting of such iconic events goes unnoticed! As it was for me, only a chance meet with an old friend landed me at the Steam Shed that day, else, I would also have deprived myself of this grand saga of an MG Steam coming alive. Also, it is to be considered that such celebrations must go beneath the ambits of the NRM and Rewari Heritage Steam Shed so that more people become cognizant of the need to conserve and protect heritage for future generations.

Eventually, it could not have been more apt than celebrating the World Heritage Day at the Rewari Steam Shed when ASHWANI took the centre stage and chugged her way into my heart forever. I convey my heartfelt thanks to the Foreman and the other Officials and Staff of the Rewari Steam Shed along with my dear friend Anmol Ezra Shah for the timely intimation which enabled me to witness such history unfold before my eyes. Truly, it was a day to remember!

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Kolkata EMUs – Trivia & Oddities

An entrepreneur and management consultant presently based in North America. A lifelong devotee of the railways, his passion was kindled in early childhood amidst the rhythmic clatter of trains in Eastern India. Growing up during the vibrant 1980s, he bore witness to the majestic twilight of the steam era on Indian Railways. His professional sojourns later carried him across Europe and North America, where he engaged closely with the world's most sophisticated passenger and freight railway systems. A connoisseur of motive power technologies, he remains deeply involved in the global community of railway enthusiasts and actively participates in specialist forums and lends his insights to researchers exploring the rich tapestry of railway science and history.

Anamitra Ghatak

Indian suburban local trains are known to the world for a lot of reasons including overcrowding. Mostly along the designs of Mumbai EMU trains that started in 1925, these trainsets eventually became national standards. Upgrades from 1.5 KV DC to 25 KV AC, from single phase to three phase and from Non-AC to Air Conditioned – all took place over last few decades. With this century long process, the primary focus has been to continually increase capacity and operate as the lifeline of the economy of Indian metropolises. Today, suburban EMU services are operated in and out of Mumbai, Kolkata, Chennai, Pune, Hyderabad & New Delhi. Regardless, the suburban trains made their respective footprints in the day to day lives of millions of working-class Indians.

Instead of delving deeper into the technicalities, we will talk a bit about the local train folklore of Kolkata. Despite being overshadowed by Mumbai local trains; Kolkata is blessed with an extensive suburban network and the suburbs depend significantly on these EMU trains managed by three divisions (Sealdah and Howrah under the Eastern Railway and Kharagpur under the South Eastern Railway). But if we look back, we will find quite a few interesting facts that happened to Kolkata suburbs alone that maybe hitherto known to local commuters and railfans.

We Used to Build EMU Trains Here Once Upon a Time

Kolkata suburban area used to have reliable suppliers that would assemble EMU trainsets not just for Kolkata, but for Mumbai as well. The list is quite long. We are talking about Jessop, Texmaco, Titagarh Wagons Ltd, BESCO etc. that worked in

A Jessop built EMU rake of Sealdah division

A BESCO built EMU rake of Sealdah division

different capacities to operate in a local railway rolling stock ecosystem. But this stopped when ICF monopolized the three phase EMU technology and the private suppliers crumbled under several reasons within and beyond the railways' control.

Each Division had a Distinctive Livery

That's true! Before the pan-Indian pink and purple became the standard (piloted by Mumbai's MRVC EMUs), Kolkata had different liveries for Eastern and South Eastern EMU locals. Eastern had the standard cream and green while South Eastern had cream and maroon. In addition to this, the Howrah Division rakes had a different front profile livery similar to an inverted downbound flower bracket, while Sealdah Division used a 'V' shaped whisker. On a shared route like Naihati-Bandel, we could spot the front of a train a mile away and could still determine whether it was a Sealdah owned or Howrah owned rake. That option no longer exists unfortunately.

EMU Trains with 'Superfast' Title

In Mumbai, we know about 'fast' and 'double fast' EMU locals. But in Eastern Railway, the fast locals are called 'galloping' trains. Beyond this, Eastern Railway operates 'Superfast' EMU locals that are very unique to this zone. The most popular Bardhaman Howrah Chord line 'Superfast' EMU was introduced to compensate for the withdrawal of Coalfield Express' halt at Bardhaman. This nonstop train covers 94 kms in 89 mins and earlier used to beat NJP Howrah Shatabdi Express as per commercial schedule. The phenomenon is still on though from the other direction when this EMU takes 90 minutes vis-à-vis 98 minutes of the Shatabdi in question. Here even, the weekly Rajdhani Express via Patna takes longer to reach Howrah from Bardhaman!

Similarly, Sealdah Division started Kalyani Superfast that would run as a local between Kalyani Simanta and Naihati, then would halt at Barrackpore before heading straight into Sealdah. I wanted to know the reason for calling this train a 'Superfast' for many years. I was told that since this train skipped a junction (Dum Dum) station, it was granted the Superfast title. As of today, the schedule of this train has been downgraded to a regular galloping local, but Sealdah

A Texmaco built EMU rake of Sealdah division

A Titagarh Wagons Ltd (TWL) built EMU rake of Sealdah division

Two distinct front profile of Howrah & Sealdah division EMUs

Sealdah - Jangipur MEMU Passenger

North commuters still refer to this train as 'Kalyani Super'.

Not All Suburban Locals were EMU's

The suburban local status did not always come with EMU rakes. Till the 90s, we had a significant part of the Kolkata suburban railway network un-electrified and served with a mix and match of regular ICF and old wooden coaches. This included Ranaghat-Gede, Ranaghat-Bongaon, Barasat-Hasnabad, Kolkata Circular Rail, Bandel-Katwa and Santragachi-Shalimar routes. Usually old and worn-out coaches were thrown into these sections. Some coaches were void of window grills and some did not have operating lavatories. Later Eastern Railway painted these downgraded coaches in greenish-cream and maroon livery to distinguish them from full service ICF coaches. Except for the Bandel-Katwa branch that operated proper mainline loco hauled ICF rakes, a lot of the un-electrified routes operated local trains with WDS4 class shunting engines. Since the self-generating capabilities could barely endure the hotel load, sometimes mid-on-generator cars were also deployed. From mid-90s, push-pull DMUs (i.e., a WDM2 in between and a few coaches ahead and behind) were put into service on Sealdah-Hasnabad, Ranaghat-Gede and Ranaghat-Bongaon sections. For some reason, Howrah Katwa locals were never operated with these DMUs. I would be surprised if such DMU rakes ever operated out of Howrah, despite sporting a sizeable ALCO diesel shed. Thanks to the Liluah EMU car shed, MEMUs got lucky in this regard. There was a Howrah Bardhaman MEMU that ran via Bandel. Similarly, MEMU locals operate under the guise of suburban services between Howrah and Kharagpur. And finally, Sealdah Division managed to blend EMU and MEMU locals in such a way that some suburban-designated Naihati and Habra locals are still operated with MEMUs.

Sealdah-Hasnabad 'Push-Pull' DMU with WDM2 in the middle. *Image provided by Sourosankha Maji*

Not All EMU Services were Suburban

The converse is also true. EMU locals running in Krishnanagar / Lalgola and Panskura-Digha routes are not designated suburban local trains. These are 'passenger' trains.

There Were Diesel Loco Hauled EMUs

When Howrah-Kharagpur EMU services were abruptly extended to Midnapore before the Kharagpur-Midnapore

Howrah - Digha EMU

A Sealdah-Lalgola Suburban EMU Passenger

Sealdah-Gede EMU

section was electrified, there was this short diesel run of EMUs. Simply put, EMU locals from Howrah would enter Kharagpur, pull their pantographs down and a WDM2 would be attached for the rest of the journey. Wild, isn't it?

And Electric Loco Hauled EMUs Too

Well, these were push-pull services with a WAM2 electric locos in the middle. But the rest of the rake consisted of regular EMU coaches. These rakes also used the EMU cab cars to control the locomotive. This was an oddity that only Sealdah Division was privy to and was never practiced anywhere else in India.

The Really Long-Distance EMU Services

Talking about the Sealdah Katwa local here. This train was known as Sealdah Salar, then Sealdah Bazarsau and then Sealdah Azimganj Passenger. Once truncated at Katwa, it became the Sealdah Katwa EMU local; covering 155 kilometers each way. That is quite a stretch for a suburban EMU service.

From Gauge Conversion to Doubling to Route Conversion; We Saw it All

The railfans' favorite Narrow Gauge lines of Bardhaman-Katwa and of Shantipur-Krishnanagar were converted to Broad Gauge. These were immediately taken over by suburban EMU services. But something very unique happened to the Dumdum Cantt. -Dumdum Airport (Biman Bandar) line. It was repurposed to operate as Kolkata Metro line that is about to unveil in full capacity. As part of this project, the overhead electrification was replaced with a third rail power supply system and other modifications were made to adjust the loading gauge.

A Bardhaman - Katwa EMU at Katwa juntion.

Our EMUs Run to the International Borders

Currently trains operate from Sealdah-Gede and Bongaon; known for being main border stations for Bangladesh traffic. A few years ago, a new station was built at Petrapole (next to Bongaon), but it has not been opened for commercial use.

Kolkata Metro has Our Back (if needed)

During the electrification and extension of Kolkata Circular Railways, Kolkata Metro supported the proceedings. Even the press notifications of charging and commissioning electrification used to come on newspapers under 'Kolkata Metro' headers.

With all the oddities, Kolkata suburban network continued to flex muscle. With a fraction of investment received as compared to the financial capital of India and under several socio-economic constraints, the network has been utilized with reasonable efficiency. There are significant opportunities to build a more potent and interconnected service network. The existing suburban system, that has its legacy in Bengal Nagpur Railway, East Indian Railway and Eastern Bengal Railway has been broadly standardized and optimized in the last few years. There are big ticket expansion (in-progress) plans along Tarakeshwar-Bishnupur, Masagram-Bankura and Krishnanagar-Nabadwip routes where suburban EMUs can be run to some distance. The entire network can be upgraded to a token-less automatic signaling controlled one, increasing the capacity further. But what we have today is no less than a couple of days' of adventure for curious railway fans to explore.

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BRIDGING LEGACIES: The Renaissance of Pamban

Anamitra Bose

Rameswaram happens to be one of the notable island towns of India and one of the most significant pilgrimage sites of the country. Also famous as the Pamban island, the island of Rameswaram is separated by the Palk Strait from mainland India. Historically, culturally and geographically, Pamban island is quite crucial for it being the second closest point to Sri Lanka's Mannar island through which regular connection with the island nation was prevalent since ancient times.

:: History ::

In August 1911, British government started construction of the Pamban bridge to link island town of Rameswaram with Ceylon through Dhanushkodi. The construction started in 1910 and the railway bridge was thrown open for traffic on 24th February, 1914. The track was a meter gauge one and steam hauled trains used to ply on the bridge. The bridge had 143 piers and has a double-leaf bascule section with a Scherzer rolling type lift span that can be raised for ship movement. Each half of the lifting spans weighs 457 tons and the bascule leaves is operated manually through levers. Each leaf took 45 minutes to lift and drop. It was the first sea bridge in India and remained the only one until the Annai Indira Setu was opened for road traffic just in parallel to it in 1988.

After departing from Mandapam station, the train used to roll on the 2.057 km long Pamban Bridge to land in Pamban island and arrive at Pamban junction. Until 1964, Pamban was technically a junction with tracks bifurcating to Rameswaram and Dhanushkodi. The line to Dhanushkodi spanning 24 km was the main line with another station Rameswaram Road enroute. The line used to terminate at Dhanushkodi Pier from where passengers directly hopped on steamers, transporting them to Talaimannar Pier in Ceylon, from where Broad-Gauge trains ran to different parts of the country including Anuradhapura and Colombo Fort. The train departing from Madras Egmore with service terminating at Colombo Fort was aptly named as 'Boat Mail'. A branch line spanning 10 km took off from Pamban junction which terminated at present day Rameswaram station. On the cursed night of 22nd December 1964, a devastating super-cyclone hit the Pamban island obliterating the Dhanushkodi rail link and causing serious damage to Pamban bridge. A train bound to Dhanushkodi from Pamban carrying more

than 200 passengers was washed away by tidal waves. All the passengers and the train's crew lost their lives in this tragic incident. The locomotive ferrying the ill-fated train – a B Class one having road number 31376 built by the North British Locomotive Company was seen submerged as the sea levels recessed. This disaster turned Dhanushkodi into a ghost town overnight.

The Pamban bridge was almost left with nothing but the bascule section with some of the 143 piers surviving the calamity. Out of 145 spans, 126 were totally washed away by the tidal waves. Under the guidance of Mr. E. Sreedharan, the meter gauge girders were brought from Assam and Rajasthan and rebuilding work was started. Some of the washed away girders were salvaged from sea-bed and utilized to rebuilding. The bridge was restored in 68 days and rail traffic to Rameswaram got restored on 1st March, 1965 but the link to Dhanushkodi was lost forever. In 2007, the metre gauge train track to Rameswaram was upgraded to broad gauge as direct trains from Okha, Kanyakumari, Tirupati got introduced thereby directly linking Rameswaram with different parts of the nation without a change in carriage. Being located at a high corrosive environment, the bridge faced multiple challenges during its period of operation. In 2009, the weakening bridge was strengthened to make it work for a few more years. In 2013, a naval barge collided with one the piers which needed immediate attention. In 2016, the Ministry of Railways decided to replace existing rolling type span with a 66m long single truss span. But, in December 2018, a fissure was detected in one of the spans and rail movement was stopped to inspect the bridge. Strain gauges were placed at 84 locations across the bridge and accelerometers at 24 locations by the IIT Madras team of experts. In March 2019, rail traffic was restored. Finally, in December 2020, the decision to build a new Pamban rail bridge was taken to replace the old Pamban bridge permanently. Two years later, in December 2022, rail transportation was permanently suspended on the old Pamban bridge closing one of the beautiful chapters of railway travel in India.

End of roads for the century old Pamban Railway Bridge

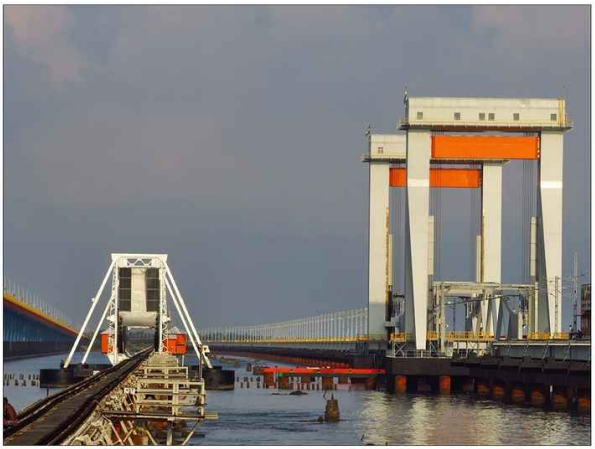
Two engineering marvel in single frame

:: The Coming-up of the New Bridge ::

Railway Vikas Nigam Limited, an undertaking of Ministry of Railways started the construction of New Pamban bridge in February 2020. The new Pamban bridge spans 2.07 km and is built parallel to the old bridge. It has 99 spans, each being 18.3 metres length apart from the vertical lift span. It is situated about 12.5 m above sea level and is about 3 metres higher than the old bridge. It is the first vertical lift sea bridge in South Asia. It consists of a bascule section of about 72.5m which is lifted vertically using a Scherzer rolling lift trunnion. The bridge is built to accommodate two electrified broad-gauge tracks, though as of now, only single track has been laid. The 72.5 metres navigational span can be lifted upto a height of 17 metres, to let larger ships pass underneath. Some of the methods adopted during the construction of the bridge includes –

1) **Selection of Launching Method :** The span was selected to be launched using pier-to-pier launching by a method called 'Auto Launching Method based on Relationship principle', designed by Suntech C.E.C and verified by experts from IIT Madras.

A long shot of the old & new bridge



Ground level shot of the two sensations of the nation

2) **Transportation, Assembly and Final Welding :** The girders were welded in specialized huts, joints inspected by PAUT (Phased Array Ultrasonic Testing). To protect from corrosion, the girders were metalized and given a special coat of polysiloxane paint. The segments were trucked to Pamban where a temporary platform with two EOT Cranes (Electric Overhead Travelling Cranes) after which girders were assembled and finally welded.

3) **Start of Launching :** The 448.305 metre long lift span was launched in 90 sequences to Pier 77-78 using auto-launching method with counterweights ensuring precise movement along a 2.65 degree curve.

4) **Component Used During Launching :** Key-components included steel stools, stainless steel sliding bases and swing-type traverse bases with guide rollers. Two front launching girders (51m each) and two rear ones (47m each) were supported at multiple points. Each girder set had ~10 MT counterweights. Tooth plates held jack pistons and 200T Hilman Rollers enabled smooth movement. Pivots allowed 360-degree rotation. Push pull jacks enabled span movement, requiring 13.375T-18.725T force, factoring lateral resistance.

5) **Hydraulic Jacking & Final Placement :** Eight 200T hydraulic jacks lifted the span and repositioned the girders. Mounted on frames at end cross girders, they hung during movement and were supported by adjustable stools at each pier, ensuring precise placement.

6) **Lift Span Movement Sequence :** With launching girders aligned and span loaded, movement began. Each pier was spaced 20m apart. The 75.70m span required two moves per pier—16m first (rear over pier), then 4m (front over next pier).

7) **Erection of Towers :** Towers were fabricated in 28 segments, painted and transported to Pamban using trailers. A temporary jetty allowed segments to be loaded onto barges via a 150 MT crane and hauled by boats. A marine crane launched segments near the navigational channel. Towers were connected by a lintel forming a 21.30m × 6.80m × 4.50m machine room housing the lifting system. The room weighs ~100 MT, with 315 MT counterweights at each end ensuring balance and smooth operation.

:: The Design and Special Features of the New Bridge ::

The modern and state-of-the-art vertical lift sea bridge have some salient features which makes it an engineering marvel.

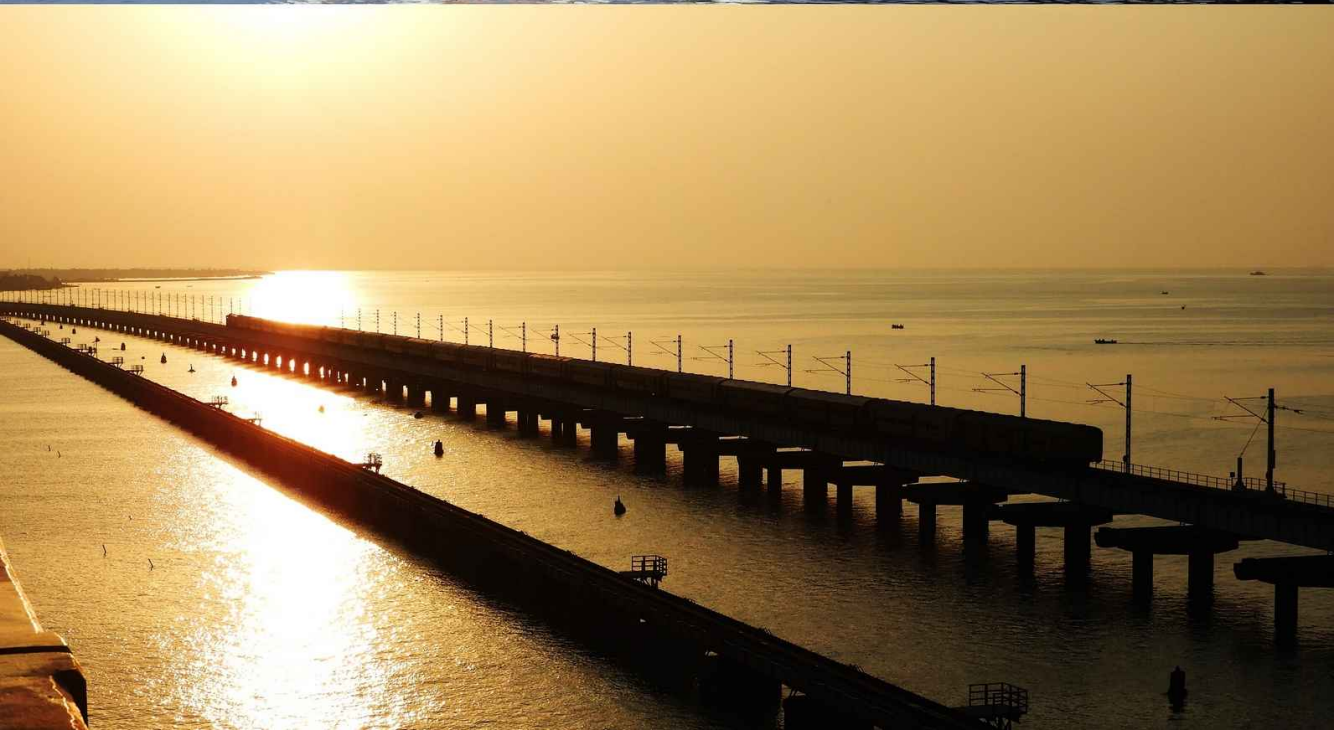
Civil Engineering Excellence –

- The bridge has been designed in a way to keep it protected from collapsing entirely in case of any mishap by fender piles, integrated with the stap beam.
- Fibre Reinforced Plastics (FRP) material has been used in walkaway, hand rails, gangway plates, stairs, gate etc. to prevent corrosion.
- The bridge has used stainless steel reinforcement for the entire bridge superstructure. 19.65 m long steel plates were specially rolled to eliminate splice joint in the approach span girders to prevent loose fittings.
- 20 metre long 60 kg rails have been used on the bridge to reduce number of rail joints.
- Fully welded girder is adopted for lift span truss to reduce corrosion.

Electrical Engineering Marvel –

- Exclusive SCADA has been used and programmed for the operation of vertical lift span. The SCADA can be operated from both the towers, sub-station and control office DRM office, Madurai.
- Complete automation of lifting and monitoring of parameters using IGBT controlled servo motors.
- Monitoring of critical parameters from DRM office.
- The bridge has system of continuous health monitoring integrating sensors in the truss, trigger sensors in the span and send the data for diagnosis.
- ROCS (Rigid Overhead Conductor System) are used in

All decked up for the inaugural run



the vertical lift span for Overhead catenary purpose and conventional OHE for rest of the bridge. The rigid contact wire is Copper round-bottom type and is of 107 mm^2 cross-sectional area.

- The bridge has a Wind-Velocity Monitoring System, installed at Pier number 38. If speed of wind exceeds 58 kmph, it will automatically trigger the control to turn the signal at both ends of the bridge to turn red.

:: Embarking on a New Journey ::

In July 2024, the first trial run took place. In November 2024, Commissioner of Railway Safety inspected the bridge to give final clearance for railway operations. As always, any project has its own share of ups and downs, this one is no exception either.

In the report submitted by CRS, Southern Circle, some glaring lapses in the newly built bridge was pointed out and concerns were flagged over it. According to the report, the vertical lift girder is not designed with RDSO approval and railways have dissociated RDSO from this project. The design of the bridge does not confirm with any of the present-day RDSO prescribed bridge designs. Moreover, additional measures need to be taken to prevent corrosion of the new bridge. At this, the Railway Board formed a panel immediately with Principal Executive Director (Bridges); Principal Executive Director, RDSO; Chief Bridge Engineer, Southern railway; Director, RVNL and an independent safety expert from IIT Roorkee. The committee cleared the bridge for safe operations stating that the design of the bridge is done by Spanish firm TYPSA and it has followed European and Indian codes of bridges. The design was proof-checked by IIT Madras. As the design was done by an international consultant, RDSO was restricted from examining the design. Rather another round of additional check was done by experts from IIT Bombay before the commencement of construction. The committee cleared the bridge which will have an operational lifespan of 100 years.

This modern engineering marvel was thrown open and dedicated to the nation on 6th April, 2025. Regular train

History created... first passenger service over the new Pamban Railway Bridge!!!

The return service back to mainland

operations which were until now restricted to Mandapam station since 2022, resumed their journey to Rameswaram from this day itself.

:: Our Visit to the New Bridge ::

As a railway enthusiast, we wanted to catch a glimpse of trains rumbling over the new Pamban bridge. Accordingly, on 15th and 16th April, 2025, on the auspicious day of the Bengali New Year, we witnessed trains hauled by General Motors beasts hailing from Golden Rock DLS over the new bridge. Soon, one may be able to witness electric locomotives rolling down the bridge after completion of electrification which is also on fast track.

We returned from the island with sweet memories of a lifetime which included spending hours by the Palk Strait with the New Pamban bridge standing tall, perhaps admiring its predecessor over its absolute success stories that lasted over a century! We hope the legacy of the 'New Bridge' outlives the bequest of the first sea bridge of the nation thereby becoming a pride of India in times to come.

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Acknowledgements –
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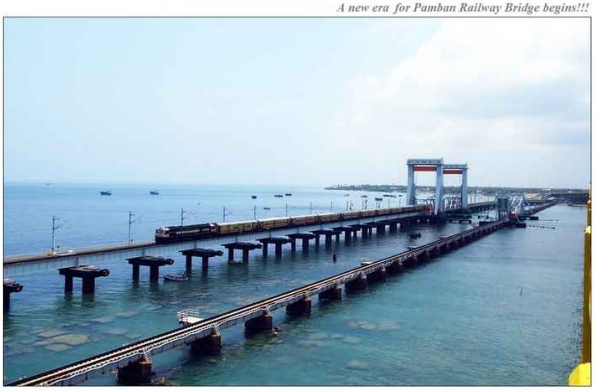
2. PIB release
3. D. Om Prakash Narayan, Senior Public Relation Officer, Southern Railway

A new era for Pamban Railway Bridge begins!!!



Steam Echoes AT THE NATIONAL RAIL MUSEUM

Anmol Ezra Shah

Anmol Ezra Shah is as a "Museo-Ferroequinologist," reflecting his deep passion for museums, railways, heritage, and photography.

Currently pursuing a Master's degree in Museology at the Indian Institute of Heritage, Noida, he views railway heritage as an integral part of cultural heritage. He is an avid rail enthusiast, who likes to take his time around, spotting trains and locos, along with weaving narratives around them on his instagram handle, @anmorak.

As a part of the 48th Anniversary celebrations of the oldest Rail Museum of the country, the National Rail Museum, Chanakyapuri, New Delhi, from 1st to 4th February, 2025, not one but two of the bygone steamers were souped back into life, their fireboxes once again lit up with burning fire, that further built over the steam that provided them the juice to move along their respective tracks at their 'forever home'.

On 1st February, on the exact foundation day of the museum, there was a lot of buzz going around. There was excitement in the air, as the people gathered to celebrate the iconic day. The event that stood out was the firing of the Patiala State Monorail Tramway (PSMT), the only surviving, one of its kind in the entire world, which comprises of a 1906-built 0-3-0 steam locomotive by Orenstein and Koeppel (O&K) with a small passenger coach as its lifetime partner. On that day, this little consist was brought back to life, and was made to go around on its track encircling a section of the museum - much to the delight of the visitors.

But there were some other surprises as well. At another corner of the museum, there was a different set of huffs, puffs and toots going on. The small, 0-4-0 Ramgotty, built in 1862 by Anjubault, France was revived with its firebox lit up with burning flame, steam flowing down its pipes once again. It was ready to move on its own with some external efforts. It even moved for a while on its designated track thereby bringing smiles to the faces of the visitors around.

The PSMT undergoing final checks before running

The Ramgotty, fired up to mark the World Heritage Day, 18th April 2024

Although I was not present at the museum on 1st February but was super excited to know that Ramgotty had also been fired up, along with the little PSMT, which prompted me to visit the museum on the last day of the celebrations as I had found out that both of these stalwarts would be fired once again on that day.

Having witnessed Ramgotty alive, once on 18th April 2024, on the occasion of the World Heritage Day, I was hoping that it would move once again, and would be a privilege to see it in working condition. So, without any second thoughts, I headed to the museum on 4th February, to behold those reverberating steams, once again.

Upon my arrival at the museum, I came across a few railfans and the staff of the Heritage Steam Loco Shed, Rewari, and Mr. Anikate Sarkar, Inspector/Conservation, NRM, who were the principal hard workers behind their firing. Just like the first day, these two steamers were once again ready to spring back to life and move along their respective tracks on this unusually rainy February day.

Firing up the PSMT was as smooth as butter, as it built up pressure in much less time and without much of an effort. The Loco Pilot of the PSMT was able to move her around for quite a number of times on that day as she ferried railfans and railway officials. She was able to garner a good amount of people as audiences who took their time to record and capture the moment through their devices.

However, things were different for Ramgotty earlier. The last instance of its firing, back in April 2024, had resulted in it moving just a few inches, due to some technical issues. It

The Ramgotty, having a moment of solace before coming alive

Mr. Sarkar shovelling some coal into Ramgotty's firebox

Full steam ahead ft. the PSMT

was a huge challenge for the staff to build up enough steam for it to move, given the time constraints. There was not enough sand in the clock to build a good amount of pressure, yet they managed to have enough for it to move around at least once, if the whistle was not blown regularly.

Also, since the loco had not moved properly in years, getting it to move on its own was another hurdle that had to be overcomed. It took around 3.5 hours for the steam to build up. The fire was lit up in Ramgotty's firebox at around 1100 hrs. By 1530 hrs, it had amassed enough steam for it to move at least once on its own which brought us to the most interesting part of the day. For him to move again, everyone around, including the staff and us railfans, decided to put a hand together and give him a 'gentle' push, while Mr. Sarkar hopped into the cab. Even on that cold and rainy February afternoon, it was quite a toil for all of us to give him that push to make him move around. Even after a few attempts, when all of us had become weary, Ramgotty was not able to move even an inch. Just the moment when everyone was about to give up with the idea of making him move, there was a last strive that Mr. Sarkar wanted all to do, and so, we

Ramgotty belching out some white smoke, matching with his paintless body

all gathered around to give him another gentle 'push', while Mr. Sarkar opened up the throttle.

Going by the saying, "Unity is Strength", I saw that the collective efforts of all the toilers coupled with Mr. Sarkar's command over the cab and with just enough luck, the wheels

Full steam ahead ft. the PSMT

After moving, Ramgotty takes a breather and ejects out some water from one of its outlet pipes.

A snippet of Ramgotty in his previous paintjob, slightly decorated to mark his lighting up on 18th April 2024.

of Ramgotty started to move once again! This time, the steam pushed the pistons and the loco came back to life once again! It was a euphoric moment for me, as I had always dreamt of seeing him alive. I exclaimed with joy which made me run across to get my share of filming such a precious moment. As the loco marched ahead on its BG track, I got my chance to film him before he was put to a stop. It was indeed a privilege to see him back in action again!

After he had moved ahead, the loco had enough steam to move back once again to his original position, which he did with ease. With this, the day had come to an end and it was indeed an experience for me to the witness the oldest exhibit of the National Rail Museum, also one of the oldest functional steam locomotives of the world and the only surviving locomotive in India that once used to run on a 4ft gauge track before being regauged into 5'6" Broad Gauge, in action.

All photographs provided by the author & are copyright protected.

Snippets from the celebration of NRM's 48th Anniversary

THE RAIL MELA OF SONPUR

Vivek Bhushan Sood

"The author holds the prestigious post of the Divisional Railway Manager, Sonpur under the East Central Railway. He is a 1994 IRSE batch with a B. Tech degree to his credit."

Sonpur, situated at the confluence of the Ganges and Gandak rivers, is a railway town that houses one of the divisions of Indian Railways. Sonpur division, set up in 1978, was earlier under the North East Railway which was transferred to the East Central Railway with effect from 1st October 2002.

Sonpur is historically known for its world-famous animal fair (or 'Pashu Mela' in local parlance) which happens to be the largest such fair in Asia. The mela starts on Kartik Poornima (in the months of November/December) and lasts nearly a month. Also, known as Harihar Kshetra mela, due to the presence of Hariharnath temple at Sonpur, the fair attracts millions who take holy dip and visit the temple before fanning out to enjoy the mela. Bathing and worshipping Harihar Nath on Kartik Purnima in Harihar area on the banks of Gandak River in Sonpur has special importance sharing deep historical roots. It is believed that Lord Vishnu freed his two gatekeepers from the curse by killing a crocodile on the banks of Gandak River in Harihar area on Kartik Purnima. The folklore also

Exhibition, Railgram, Sonpur

holds that Chandragupta Maurya – the founder and the first emperor of Maurya Empire used to buy elephants and horses from this place. From ancient times, Kartik Purnima Mela has catered to nearby local residents belonging mostly from agrarian society with sale and purchase of essential items of day-to-day use. The sale and purchase activity for the whole year was carried out during the month's period when this Mela was organized.

Since its inception in 1978 Sonpur Rail Division and Kartik Purnima Mela have shared

The Toy Train @ Rail Gram station

an inseparable symbiotic relationship from successful organizing of Mela to safe carriage of Mela visitors and promotion of local business. Year after year, the challenging task of providing infrastructure, basic amenities together with handling of such mammoth crowd and safe transportation of passengers from Chhapra, Barauni, Muzaffarpur and Patna has been successfully ensured by Sonpur division all these years.

The whole town decks up for this annual event, and gets choc-o-block with eateries, rides, fortune tellers, artists of various hues and of course, animals. It is good time to have a look

Rail Coach Restaurant, Railgram, Sonpur

at exotic breeds of horses, cows, buffaloes and goats. With the ban on birds, elephants and exotic animals, the fair has lost a bit of its charm but the *mela* is adapting by showcasing the latest 'beasts of burden' – the tractors and such other farm implements now.

Center piece of the *mela* is the pavilion set up by Bihar state government where cultural programs are held throughout the month. Classical and folk artists take turns to showcase their art and entertain visitors to the fair. Various government departments put up their stalls to showcase their achievements and programs. Huge crowds throng the khadi and handicrafts department area for shopping.

But the *mela* is incomplete without mentioning the important role played by the railways. Trains are prime mode, ferrying the huge number of visitors. Every year special *mela* trains are run from Muzaffarpur, Chapra & Patna to Sonpur and 24 additional ticket counters are set up. The entire path between *mela* ground and Sonpur railway station is full of passengers, and special efforts are made by railways to ensure that the passengers safely board their trains. A major concern of railways is to prevent any mishaps when train stops due to chain pulling on Gandak River bridge at approach of Sonpur station. The entire railway team, led by RPF, Commercial, Scouts and Guides work tirelessly during this *mela*.

Another interesting aspect is that large part of the official mela facilities including '*Nakkhas*' meaning cattle market, temporary police station, temporary fire office etc. are set up in the railway area. The C & W/P-way training school campus is situated opposite to the main stage set up by the State Government. The crowd throng to enjoy toy train (which is actually a decoy train running on road and pulled by a fork lifter dressed as engine!!) that takes off from sole platform of the '*Railgram*' station. They also visit railway's historic photo gallery, enjoy working and scale models of trains and stalls set up by various departments within railways. In recent years, the food stall within the training school premises has been converted into a coach restaurant and more area is being added by railway to add to the mela facilities.

Sonpur Division has played a pivotal role in management and smooth conduct of Kartik Purnima Mela. In course, various unprecedented fresh initiatives aimed at optimum monetization of available railway land were introduced at Rail Gram, Sonpur providing new services which have become point of attraction for Mela visitors. Last year, Sonpur division handled a total of 4,30,679 passengers compared to 3,36,840 passengers in the previous year registering a 27.85 % increase in the volume of passengers. A total earning of ₹ 1.6 Cr. has been generated during Kartik Purnima, 2024 compared to earnings of ₹ 1.47 Cr. from previous year which is 7.4% higher. The augmentation in Mela area served well not only in accommodating the plethora of visitors but also by providing ample space for their hassle-free movement inside the Mela campus. The efforts put by Sonpur division in satisfactory conduct of Mela 2024 was recognized and duly awarded by the State Government.

Model showcasing Amrit Bharat stations, Vande Bharat/ Amrit Bharat trains and new developments in railways continue to enthuse the rail fans and wide-eyed children. After enjoying models showcasing signal interlocking or operation of 140-ton crane lifting wagons and three rounds of toy train, the children carry loving memory of railways with them. The role played by railways in development of this part of India and in the mela are both aptly showcased here, adding an interesting layer to the mela experience.

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This article has been facilitated by Mr. Atulya Sinha, IRSME, currently serving as the Chief Administrative Officer (CAO) of the Rail Wheel Plant, Bela.

Vande Bharat Train & Other Models

FEATURE

THE RADIANT ROAR

CELEBRATING CAB CRAFTSMANSHIP

Anamitra Bose & Sripad Ullas

The Cab Modification Contest on electric locomotives was held at the Benaras Locomotive Works (BLW) this year. A total of thirteen Locomotive Sheds participated in the contest. In a surprise move, the host itself participated in the contest with its latest modifications on a WAP7 turned out by it. Thus, a total of 14 locomotives battled it out for the ultimate prize.

The parameters of the contest include *Overall Ambience (incl. painting/panelling), Water-less Urinal, Noise isolation Improvement, Air conditioning - Thermal insulation Improvement, Seat Improvement, Floor Improvement, Easy alright exchange and Provision for keeping bags and belongings of crew* – each carrying 10 marks. Another 20 marks were allocated for Innovations like *Upcoming Caution Alert System, Better-lookout glass cleaning mechanism, Single key (one) operation for taking charge/changing cab, Desk modification to facilitate reach of all required switches while being on seat, Sun visor Improvement, CVVRS & Driver Advisory - drowsiness, callout,* etc. Thus, the contest was of 100 marks.

Now, let us take a tour into each of the participating locomotives to find out the innovations that went into modifying the cab for better crew comfort & improving the aesthetics within a pre-approved budget of 40 lakh INR.

- **Kanpur (CNB) :: WAG9HC 32309**

The nominee from Kanpur Electric Locomotive Shed of North

Image courtesy: BLW Official Page

Central Railway was WAG9HC #32309. The locomotive was painted in a yellow, grey and black livery with a theme of 'Go-Green'.

The salient features include –

- The locomotive has been equipped withan interactive computer screen with Windows OS in the driver desk in ALP side, known as Cab Control Unit. It displays fault on locomotive, camera screen, transformer oil levels, traction motor, bearing temperatures, TSDs, station and signal locations, pantograph and system pressure gauges in the screen. Additionally, it also displays the trouble shooting document. The panel allows secure audio calls with TLC and sheds during failure. It maintains comprehensive fault log with timestamp for monitoring purpose.
- The locomotive is fitted with CO_2 monitoring system which triggers an alert in the locomotive with increase.
- Additional temperature sensors have been provided in traction Motors which are displayed in real-time in cab control unit.
- **LiDAR** (Light Detection and Ranging) sensors have been installed in front of the locomotive, beside the MU UIC port. *This is a first-of-a-kind in IR where it can detect any obstacle and send alert to the crew, helpful especially in fog seasons.*
- Driver-desk is modified into one level with provision of additional Driver Display Unit for ALP.
- Inspection official seats have been provided.
- First-aid box and cabinets have been provided.
- Waterless urinal has been fitted.

- Refrigerator has been provided for crew.
- Automatic Lighting in HB/SB cubicle, i.e., motion and position sensors have been provided in cubicle access doors which turns on the lights inside cubicle when it is opened. The light sources aresuitably positioned and are bright to illuminate the cubicles.

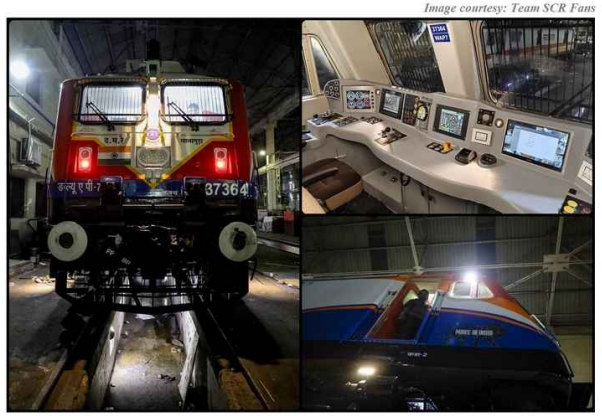
• Lallaguda (LGD) :: WAP7 37364

The nominee from Lallaguda Electric Loco Shed of South Central Railway was WAP7 # 37364. The locomotive was painted in an eye-catching livery of White, Red and Prussian Blue.

The salient features include –

- LGD installed an easy-alright exchange lights with an extra LED lights downside for better illumination.
- Alongside cameras for look-back facilitation, LGD installed camera for CBC coupling and extra LED lights to focus on buffers during coupling process.
- The locomotive has been provided with Motorized Hand Brake, known as Power Brake in the cab.
- The locomotive has additional handle and LED footstep lights for helping crew to climb the loco with ease.
- The driver desk has been designed with FR grade Fiber Reinforced Polymer desk which improves thermal comfort and is glossy and dirt-resistant surface.
- The layout is redesigned to bring all controls and displays in a single line of sight and minimize movement and fatigue.
- All essential switches, HMIs, gauges and push buttons are within reach of the crew. Analogue pressure gauges have been replaced with digital pressure gauges.
- RS cock has been placed on driver desk for easy access of accessed by ALP.
- The rotary switches have been modified and 110V AC socket and walkie-talkie charger has been provided on the desk.
- For thermal and noise insulation, multi-layered insulation

Image courtesy: Team SCR Fans



system has been installed which include thermal paint coating, triple-layer insulation and dual-cladding cavitation.

- For better circulation of air, Split Duct system including separate vents for LP and ALP at chest and under-desk knee levels as well as adjustable flaps in AC vents has been provided.
- Motorized wipers have been provided.
- Crew and LI seats have been upgraded as per Vande Bharat standards.
- Waterless urinals, Sun visor and Cab flooring has been worked upon.
- Desk and cab lights have been improved with warm-white lights and individual LED lamps.

• Royapuram (RPM) :: WAP7 30333

WAP7 #30333 was nominated from Royapuram Electric Loco Shed of Southern Railway. The locomotive had been assembled at CLW and is provided with Medha Servo Drives made Traction and Hotel Load converters. The locomotive was painted in a special theme of 'Infinite Power Endless Journey'.

The salient features include –

- Driver desk upgradation and reorganization for ease of access and maintenance.
- Single lookout glass mechanism like Vande Bharat for better visibility.
- Upgraded WAG12 type ventilated seat for drivers.
- Inspecting official seat modification.
- The cab has been completely fitted with ACP panels for thermal and noise insulation.
- The floor has been layered with anti-skid floor mat.
- Waterless urinal and large cupboard for luggage of crew.
- Motorised wipers for efficiency and auto-refilling water tank have been fitted. The water tank gets filled up by outgoing water outlet of Cab AC unit. Water gets drained out when the tank is full.
- The AC vents have been modified for uniform cooling.
- Cab lights have been modified with LED lights, Strip LED lights for gauge illumination, touch screen panel is provided for control of cab lights and fans.
- Digital caution order alert system with LED screen.
- CVVRS display with 16 cameras around the cab and in-cab display.
- Driver fatigue and driver health monitoring systems have been provided. SpO2 – a measure of peripheral oxygen saturation and blood pressure measuring instruments have been provided.
- Electronic Easy Signal Exchange Lights have been provided.
- Digital B panel with pneumatic gauges have been fitted.

• Hubballi (UBL) :: WAG9HC 32983

The locomotive numbered #32983 was selected by the Hubballi Diesel Shed for Cab-Modification Contest. The locomotive was already equipped with a waterless urinal closet since when it was rolled out, making the work much easier. The locomotive is equipped with Bombardier Transportation propulsion kit. This Loco is painted in a theme depicting the glory of Hampi Chariot, Mysuru Palace along Kambala Traditional Race and Yakshagana Dance. Also, the new logo for Hubballi Diesel Loco Shed has been showcased over the loco. The locomotive was aptly named as 'Madakari' which in Kannada means the aggressive elephant. The modifications were planned for 3 major categories – Aesthetics, Crew Comfort and Technological Improvements.

The salient features include –

- The driver desk including all the panels has been re-modified accordingly to facilitate all the required switches to be accessed easily by Loco Pilots while being seated.
- Vande-Bharat type seats with foldable arm and head rests

Image courtesy: Rahul Nivaskar

Image courtesy: Sripad Ullas

with rotatable angles have been provided.

- The loco is also equipped with a refrigerator, LED Spotlight with dimming control, CLI inspection seat, backlit LED caution order board, night lamp, camera for monitoring with troubleshooting tab.
- Train protection system like KAVACH is introduced in this loco which makes this the first KAVACH equipped loco of SWR.
- Keeping in mind the comfort of the crew, all the modifications have been carried out on this loco, within a record and remarkable time of 02 weeks after arrival of loco in the shed.

• Ajni (AJNI) :: WAG9HC 33330

The locomotive nominated from Central Railway was Ajni Electric Locomotive Shed's WAG9HC #33330. The locomotive was assembled by CLW and has BHEL made propulsion system. The locomotive was given a fresh coat of paint in the usual green goblin WAG9 livery and nothing eye-catching as such was done in the livery aspect. But the shed authorities worked upon the interiors.

The salient features include –

- The thermal and noise insulation alterations include insulation of the cab and roof with FRPs to dampen noise and for keeping the cab thermally insulated.
- Driver Desk has been modified in a uniform panel so that crew can have access to all required switches and gauges while being seated.
- The flasher and AC control boxes have been relocated to ALP side.
- The AC air flow ducts and outlets have been modified with flaps and diverter to ensure uniform cooling and better air flow.
- The cab fans have been replaced with noiseless ones having higher speed motors which are placed in the back side of the crew, instead being on the front.
- Small Cool-Box has been provided to help crew keep their water bottles cool.
- The Sun Visors have been modified to curtain type ones which can be easily operated and adjusted to any height.
- Additional heavy duty foldable seat has been provided for officials or CLI.
- Walkie-talkie and log book holders have been provided beside driver desk.
- All right exchange lights have been provided and panels are placed near both LP and ALP.
- LED lights have been provisioned below driver's desk for better view of paddle switches.

Image courtesy: BLW Official Page

• Vadodara (BRC) :: WAG9HC 31416

The nominee from Western Railway was Vadodara Electric Loco Shed's WAG9HC #31416 locomotive. The locomotive was assembled at CLW and has a BHEL made traction converter. The locomotive is painted with an interesting livery of white and red, inspired from the livery of Lucknow's WDP4D #40515 locomotive which was originally designed by Railfan Protkarsh Kumar and team. The locomotive shed logo design is also inspired from the same design. The locomotive has been named as Loh Purush, after Sardar Vallabhbhai Patel, the second locomotive to hold this name in India after WAP4 #22333, also named and earlier held by Vadodara ELS.

The salient features include –

- Improved driver desk with Corian marble panelling on stainless steel desks.
- Heat insulation and sound-proofing in the cab.
- Crew Friendly Chairs for improved visibility for crew and better chair position for footplating officials.
- Single Look out glass.
- Electric Wipers and electric pump for washing.
- Waterless Urinals.
- Space for Luggage for LP / ALP.

Images courtesy: BLW & BRC official pages

- 20Litre Water Filter for LP / ALP.
- OverReach Detector valveis now placed in Machine Room instead of loco roof. OverReach Detector valve detects if pantograph height is higher than OHE height ina High Rise OHE section and it drains the pantograph pressure to maintain the proper height.
- Air Flow Monitoring System in the cab.
- Retro Reflective stickers in machine room pathways.
- Digital troubleshooting directory in tab in front of ALP.
- Spring-loaded pull-down Sun Visors.

• Howrah (HWH) :: WAP7 37358

The nominee from Eastern Railway's Howrah Electric Loco Shed was WAP7 #37358. The locomotive was painted in a futuristic livery inspired by PCB boards and hexagon shaped patterns on a gradient livery from sky blue to darker shades of blue. The locomotive has propulsion of Bombardier Transportation and Hotel Load converter by Medha Servo Drives.

The key features include –

- The locomotive has modified the Harmonic filter FB cubicle and provided the Waterless urinal in its place.
- Sound & Thermal Insulation in the cab.
- The driver desk has UBA, OHE, TE/BE Digital Meters and gauges for the crew to have better understanding.
- The loco has Look Back Camera, Front Camera and 7" Display Tab for view.
- FRP Sheet and Epoxy Resin Coating in the cab.
- Acoustic Anti-Skid Floor mat in the cab floor.
- Silicon-Coated UV Resistant paint on cab roof to improve thermal insulation.
- Electrically Operated Wiper.
- Driver Drowsiness and BehaviourMonitoring System (AI-Based) installed in the driver desk to alert the crew.

Image courtesy: Arkopal Sarkar

- Temperature Monitoring System to keep the temperature inside cab in check during summers and winters.
- Modified driver seats with hand rests like the ones in Vande Bharat cabs.

• Malda Town (MLDT) :: WAG9HC 38722

Another Diesel Locomotive Shed participating in the competition, apart from the Hubbali was Malda DLS from the NorthEast Frontier Railway. The locomotive nominated was WG9HC #38722. The locomotive was painted in the base paint of green and hand-made painting and murals of notable places from NFR. The paintings included Firoz Minar, Bogiebeel Bridge, Kamakhya Temple, Shivsagar Sidol, Tawang Gate, Billeswar Temple, Coochbehar Palace, Toy Trains of DHR and a Giant Buddha Statue from Sikkim. The locomotive was manufactured by CLW and has Medha made propulsion system.

The key features include –

- FRP Panels
- Modified updated Driver seats
- CCTV [2 for OHE in roof, 2 in cab, 2 for rake formation between windshields]
- Walkie-talkie charging point
- Water bottle holder
- CLI Seat
- Waterless Urinal
- Complete harmonic filter cubicle and roof mounted resistance box has been removed.

Image courtesy: BLW Official Page

• Bondamunda (BNDM) :: WAG9HC 41077

The zone with the highest number of electric locomotives – South Eastern Railway sent their participant in the form of WAG9HC #41077 from Bondamunda ELS. The locomotive was given an attractive livery of Black, Grey and Blue. The propulsion system in the loco is provided by Bombardier.

The key features include –

- The locomotive has FRP based redesigned Driver Desk.
- The locomotive has Waterless Urinal Facility.

Image courtesy: BLW Official Page

- The locomotive has inspecting official and CLI seat.
- BPVG Modification has been carried out, i.e., instead of foot operated Vigilance acknowledgement switch, now it is a push button on the driver desk.
- Digital Gauges in the panel.
- Thermal and Noise Insulation in the cab.
- Eight Surveillance Cameras around the locomotive.
- Modified RDAS (Railway Driver Alertness System) which monitors if driver is inattentive or drowsy.
- Caution Order Board for LP and ALP in the desk.
- VB Type Driver Seats for better comfort.

• Deen Dayal Upadhyay Nagar Jn. (DDU) :: WAG9HC 42007

The locomotive nominated from East Central Railway's Deen Dayal Upadhyay Nagar Jn. (erstwhile Mughalsarai) Electric Locomotive Shed was WAG9HC #42007. The locomotive has been christened as *'Vidyut Setu'*. On the yellow band, hand paintings of Madhubani art have been crafted giving the locomotive a unique look. Additionally, painting of places in and around the Viswanath Temple and Buddha's statue of Sarnath has been replicated on the locomotive. The locomotive was assembled by BLW and propulsion system is by Crompton Greaves Ltd.

Image courtesy: BLW Official Page

The key features include –

- Thermal & Noise Insulation has been ensured by cab FRP.
- Re-Designed FRP Driver Panel into one level for much better ease of operation by both LP and ALP.
- The cab has been fitted with high-speed fans and first-aid box.
- Luggage cabinets have been provided for crew in back panel.
- Motorized Hand brake facility with push buttons and indicators for released and applied condition.
- Water less Urinal has been fitted in the locomotive.
- The locomotive is fitted with Fridge.
- Better quality of motorized blinds has been installed as Sun Visors with switches for bringing them up or down.
- Side Mirrors have been provided.
- Power Window is provided in the cab with buttons.
- Electrical wipershave been installed and water closet has been shifted inside driver cabinet.
- Additional display for ALP indicating parameters of OHE, TE/BE and battery voltages.
- The locomotive has been foot step lights to help crew climb at night.
- Automatic headlight dimmer facility which will dim the headlights automatically if there is an approaching train to avoid distraction.
- RDAS has been fitted in the locomotive.
- Water bottle holder and Log Book Holder has been provided.
- AC Temperature control display panel with two buttons to control the cab temperature using AC.
- Online Monitoring of cooling capability using temperature sensors in cab and machine room to check if cooling is effective enough, which can be tracked in server.
- CLI Seat has been provided in the cab.
- LED Easy alright exchange signal has been fitted with the switches near the driver desk.
- Comfortable 360 degrees rotatable chairs have been provided for the crew.

• Bhilai (BIA) :: WAG9HC 31394

The locomotive nominated from South East Central Railway was Bhilai's WAG9HC #31394. The locomotive was sent to participate without any special livery. The locomotive has BHEL made traction converter system.

The key features include –

- AC fitted cabs.
- RDAS fitted driver desk.
- Inspection official and CLI seat provided.

• Tughlakabad (TKDD) :: WAG9HC 41625

The locomotive nominated by Northern Railway was not from any ELS like Ghaziabad or Ludhiana but from Tughlakabad Diesel Shed. The locomotive nominated was WAG9HC # 41625 which is assembled by PLW and propulsion is of Bombardier. The locomotive is painted in a beautiful livery of Red and Yellow.

The key features include –

- The driver desk has been redesigned into one level of desk and fitted with Mild Steel Sheet and Fibre Reinforced Polymer to give it a glossy look. The driver desk resembles with that of GE (Wabtec) diesel locomotives, i.e., WDG4G and WDG6G with respect to aesthetics.
- The rear wall of the cab has been also worked on.
- Waterless urinals are fitted in the loco.
- CCTV and cameras have been installed in the sides of the locomotive, above windshield and near pantographs. Display has been provided inside the cab for camera views.
- Provision of better windshield cleaning facility by using better wipers and covered defogger mechanisms.
- Android Tab has been installed with Trouble Shooting Document.
- Provision of single switch for fire suppression system to start spraying CO_2 on important machineries in the machine room in case of fire, instead of separate fire extinguishers.
- Double seats for inspection officials.
- LED destination board has been fitted.
- Mini refrigerator has been fitted for crew.
- Modified footsteps have been provided while climbing the loco.
- Light has been provided in under carriage to carry out underframe inspection.
- Digital pneumatic gauges have been fitted in place of the analog ones.

Image courtesy: BLW Official Page

- Easy LED exchange light system has been provided with switches vertical to driver desk.

• Vishakapatnam (VSKP) ::WAP7 37419

The locomotive nominated from largest Electric Locomotive Shed of India, was WAP7 #37419. It was wrapped in a tricolour livery and showcases East Coast Region's cultural and industrial significance. The locomotive has Vishakapatnam Port, SAIL Steel Plant, Simhadri Temple, Puri Jagannath Dham Temple and Konark Temple imprinted on it.

The key features include –

- Fiber Glass wool used in driver dashboard for smooth finishing.
- Blue LED strip lights below desk header have been provided to illuminate desk and gauges.
- DUCO paint in cab walls for smooth and shiny look.
- Digital Caution order screen.
- Rear view camera with display in the cab.
- Anti slip flooring.
- Water less urinal fitted.
- Thermal and sound proof damping sheets.
- Improved ventilated LP/ALP Seats like Vande Bharat.
- LED Signal exchange lights
- Power Windows with switches in cab.
- AC vents for LP/ALP with flaps and in machine room.
- Adjustable spot lights for crew.
- U-shaped ambience lighting in cab by profile lights.
- QR code for loco features & schedule details.
- Radium stickers in cab to guide LP & ALP during darkness.
- Radium sticker in machine room path way along with ceiling profile lights have been installed.

Image courtesy: BLW Official Page

- Holders for water bottles
- Console for keeping Walkie-Talkie charger.
- Seats for foot plating official.
- Rack for Loco Logbook.
- Signal call out detection and provision for mic for both LP/ALP.
- Three step fan speed controllers have been provided in the cab and fan motors used are of 12v, 24W, 120 RPM rating.

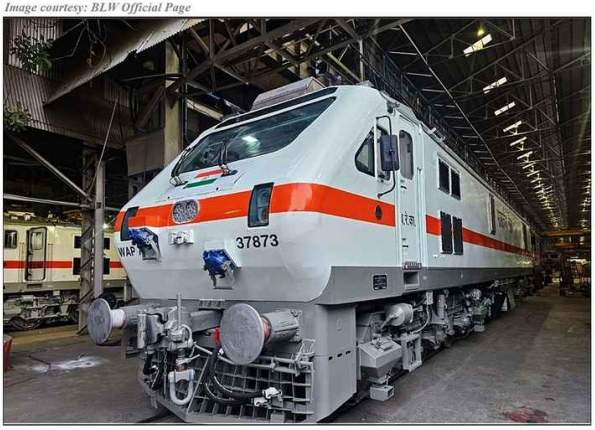
• BLW :: WAP7 37873

Last but not the least, the nominee from the host itself, WAP7 #37873 assembled by the Banaras Locomotive Works.The loco is the first amongst a set of WAP7s which is set to roll out with such aerodynamic cabs. The original allotment of #37873 is though for Tughlakabad ELS under WCR, but BLW nominated this loco for itself to get into the competition. The locomotive ran in this race for it being yet to be despatched from BLW for its earmarked shed. The locomotive is given an aerodynamic look, with both cab profiles modified to a more increased angle of inclination. The livery is the standard livery of WAP7. The locomotive subclass is named WAP7AD.

The key features include –

- The cab profile of the locomotive is changed to 45-degree incline to accommodate FRP driver desk and give the locomotive an aerodynamic look.
- The roof profile was altered a bit and corner radius of the roof was slightly altered to match the inclined cab profile.
- A 'C' shaped rain gutter channel was cutout in roof and AC was placed in such a way so that it could be accommodated in the aerodynamic cab roof. The AC is placed perpendicular to the present AC configuration as in standard WAP7s. The modified cutout position and widened rain gutter helps to dismantle cab roof even without removing the AC unit tray.
- The cab door width has been reduced by 100 mm so that it does not collide with the extended driver desk.

Image courtesy: BLW Official Page



- With aerodynamic cab profile, the floor area in WAP7 cab has increased slightly.
- The nose-to-nose length of WAP7AD is 344 mm longer than WAP7.
- The most significant feature in the cab is the Vande Bharat styled FRP driver desk and console. The driver desk aims to bring the gauges and controls in a single area implying better ergonomics for ease of operation by the crew.
- The windshield is a single grill less lookout glass with better visibility.
- The electrical wipers installed in the windshield has long arm lengths and integrated water tanks.
- The side window has two parts – fixed one and sliding one instead of fully fixed ones as in WAP5 AB version.
- The blinds installed are of VB type and rear-view mirrors are also installed.
- An internal grab rail has been provided in the cab for safety of the crew.
- The BPVG modification focussing shifting of vigilance acknowledgement switch from pedal operated to push button on driver desk has been done.
- The LED headlight has been placed below the front windscreen, doing away with the focussing issues faced in AB WAP5s.
- The cab interior has been furnished with FRP and insulated from thermal and sounds.
- 3D adjustable and 360-degree rotatable Vande Bharat type seats have been provided. Also, the height has been increased by 6 inches to avoid issues faced in AB WAP5s.
- An inspector seat has been provided.
- Water filter with hot and cold-water facility has been provided.
- A luggage box has been provided.

After going through all the parameters and the changes effected by the different participants, the winners were announced.

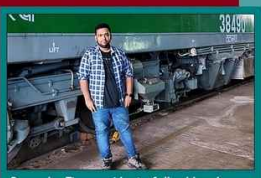
First Position	**LGD** of SCR and **RPM** of SR
Second Position	**VSKP** of ECoR, **CNB** of NCR and **AJNI** of CR
Third Position	**DDU** of ECR, **BRC** of WR and **UBL** of SWR

This contest showcases the different innovations in Aesthetics, Cab Innovation as well as Technological Aspects of locomotives. We hope some of the best features are incorporated in the newly turned-out locomotives along with retrofitting them in the existing ones for the sake of crew comfort and easier maintenance of the locomotives.

Acknowledgment:
The article could not have been possible without the invaluable inputs from Ansuman Satpathy, Rahul Nivascar, Kamatham Sirish and Somanko Tiru.

Steel Turns 55

A Legacy Forged in Motion



Somanko Tiru, resident of Jharkhand, was born and raised amidst the vibrant cultural milieu of Kolkata. A professional accountant by vocation, he holds an academic degree in Science and Technology—an educational foundation that complements his profound passion for the world of railways. A true rail enthusiast at heart, Somanko is deeply devoted to the study and appreciation of railway systems, with particular interests spanning Electric Traction, state-of-the-art Rolling Stock technologies, and the evolution of modern Ticketing Systems. His engagement with the subject is not merely casual but reflects an intellectual pursuit and admiration for the technological and operational grandeur of the Indian Railways and beyond.

Somanko Tiru

1st April 1970 – the day when the people of Jamshedpur witnessed the beginning of a dedicated train service to Howrah. There were huge requests from various quarters of Jamshedpur which eventually led to the commencement of this train. The train was introduced with such a set of timings where one can reach Kolkata from Jamshedpur and return to Jamshedpur after completing their work on the same day. When the train was introduced, it was introduced as Tatanagar - Howrah Express and the name 'Steel Express' was given later. Started as Train Number 13 Up and 14 Dn, the train is at present numbered as 12813 Up and 12814 Dn. In between, there were changes in the number, for quite a few times. As of today, even after having 2 Vande Bharats catering Tatanagar and Howrah, (Ranchi - Howrah Vande Bharat and Howrah - Rourkela Vande Bharat), Steel Express the first choice for most of the passengers thereby garnering huge patronage.

Another interesting fact regarding this train that it had, more or less, all

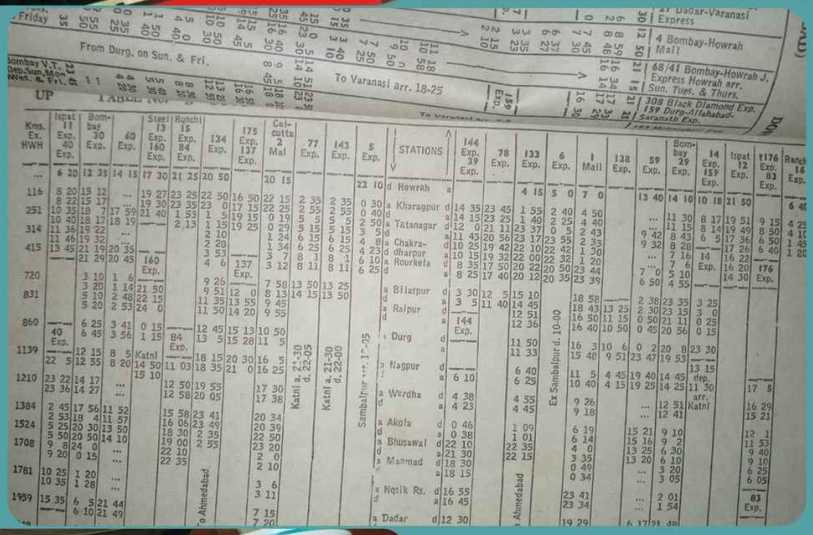
the classes of accommodation to offer, except Non-AC Sleeper, at different times. The train always had seating accommodations (General, Non-AC Reserved Chair Car and AC Chair Car) but long ago it had AC 2 Tier for a temporary period. AC 3 Tier was there for 2 different set of times. AC First Class was also available for more than 7 Years (In 2011 and then again 2012 - 2019). When

converted to LHB from ICF on 11th June 2018, both AC 3 Tier and AC First Class were available but soon after, the AC 3 Tier was discontinued (a temporary augmentation) and then in the first quarter of 2019, the First AC was replaced by AC Executive Chair Car. AC 3 Economy was introduced in Steel Express from 1st May, 2025. Pantry Car was available during ICF times and it offered a wide range of mouthwatering delicious breakfasts and snacks. Post LHBfication, it was done away with. Once regularly hauled by the Tatanagar WAM4s, the train now gets WAP7s either from Tatanagar, BondaMunda or Santragachi ELSs.

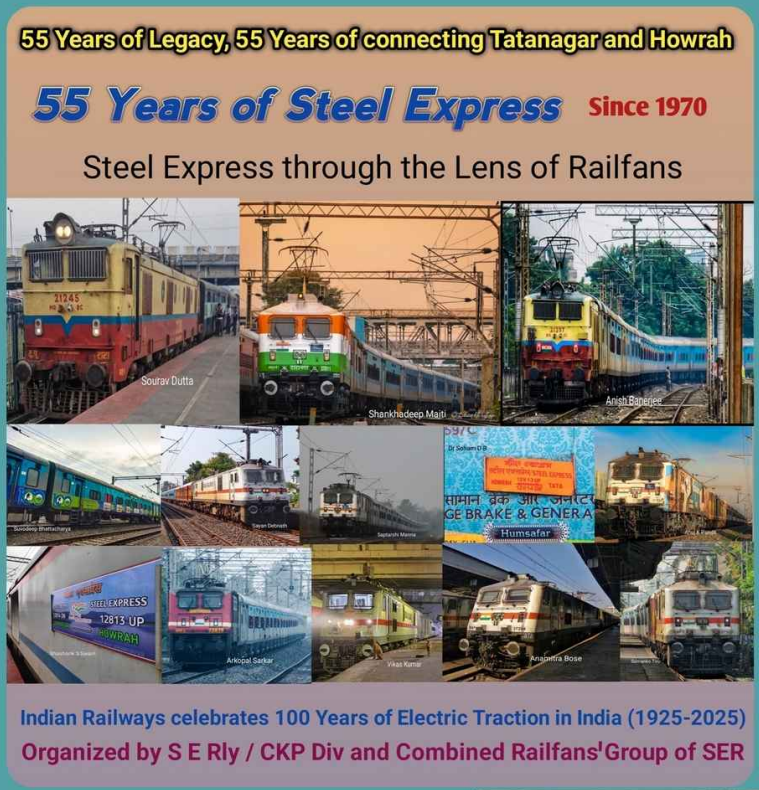
A train of such relevance and importance thus demanded a celebration, if not a grand one, but at least a commemorative

felicitation at it was about to turn 55! Looking back, plannings had initially started with the Railfans of South Eastern Railway (SER), around December 2019, to celebrate the Golden Jubilee of the train. Some communications were also carried out but the pandemic of 2020 spoiled everything and all proposals had to be dropped for obvious reasons. We took pledge the day Steel Express completed 50 Years, that if circumstances allowed, we will be celebrating the 55 Glorious Years of Service of the train for sure.

As years went, things became neo-normal and with us entering 2025, it was time to swing back in action to fulfil the pledge we had taken 5 years ago. 2025 is the year when Steel Express turns 55 on 1st April. Without wasting

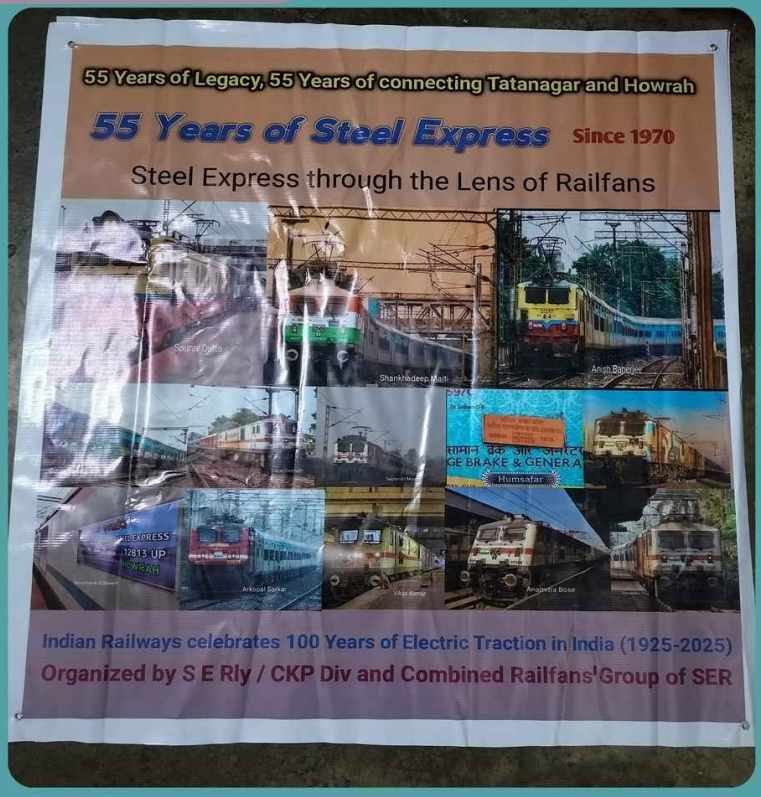


any time, I along with three Railfans from Tatanagar – Vikas Kumar, Shashank Shekhar Swain and Anuj Kumar Pandit, started to plan for the celebration. We approached the SER Headquarters for permission. On the behalf of our group, I met the PRO 1 of SER for the said purpose. Verbal permission was immediately granted but a written one was to be issued few days before



the actual celebration. Once we got a verbal go ahead from the Headquarters, we started our plannings and preparations.

We asked the Railfans of few groups to design the Anniversary Special Train Boards for Steel Express. I may also add that, all the LHB trains of Tatanagar Coaching Depot have train boards designed by Railfans, at least on one of the rakes of each train. Anuj Kumar Pandit designed the 55th Year Special Belly Boards (Large TBs) and Soham Das designed the Destination Boards (Small TBs). A collage was prepared, after collecting various photos of Steel Express from various Railfans from varying period, for putting up on the Locomotive and SLR. The printing of the stationaries was carried out in Kolkata and the printouts were sent to Tatanagar, a week before the celebration. After the arrival of Steel Express from Howrah on the 31st March night, we (myself along with Vikas Kumar and Shashank Swain) started executing our plans that implied putting on the new train boards and decorating the rake and the new boards. Early morning before the departure, Anuj Kumar Pandit joined us and then decorated the nominated locomotive for Steel Express. Loco #37591 was to do the honours on the 55th Birthday from Tatanagar end. The loco although carried Tatanagar




ब्रेक और जेनरेटर कार
GAGE BRAKE & GENERATOR CAR
ATANAGAR HOWRAH
12814 12813
STEEL EXPRESS
www.irfca.org


Shot on OnePlus
By Somanko 2025.04.01 05:41


225006
ATANAGAR HOWRAH
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STEEL EXPRESS
सामान
LUGGAGE
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नाटानगर जं.
55 Years of Steel Express
Indian Railways celebrates 100 Years of Electric Traction in India (1925-2025)
Organized by S E Rly / CKP Div and Combined RailfansGroup of SER
Shot on OnePlus
By Somanko 2025.04.01 05:45


856/C सामान ब्रेक और जेनरेटर कार
LUGGAGE BRAKE & GENERATOR CAR
ATANAGAR HOWRAH
12814 12813
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Shot on OnePlus
By Somanko 2025.04.01 05:49

markings but had recently been transferred to Santragachi, a few days back. We felicitated the crew which included LP (Sri N L Soren), ALP (Sri F Thakur) and Train Manager (Mr. G P Rao) with Sweet Boxes as Steel Express finally departed from Tatanagar, bang on time.

Just like any other day, Steel Express had a smooth run till Howrah and being onboard on the special day made my day. Some aware passengers were taking photographs of the boards after arrival at Howrah. On the return leg to Tatanagar, Steel Express was assigned with Tatanagar WAP7 #37520.

:: A Vote of Thanks ::

I would like to thank CPRO/SER Sri OP Charan, PRO 1/SER Sri Sopan Datta for the necessary permission. Thanks to DGM(G)/SER Sri P. Gupta, Secy. to PCEE/SER Sri Master Mukesh, Sr. DCM/CKP Sri A. Choudhary, ARM/TATA Sri A. Singhal, Station Director/TATA Sri Sunil Kumar and Station Director Mr. Sanjay SSE(I/C)/ETS/TATA for all the necessary cooperation at Head Qaurters and Divisional Level. And last but not the least, Tatanagar Coaching Depot, especially CDO/TATA Sri Avinash Singh, SSE (C&W)/Sri Manoj Kumar, SSE Sri A. Patro, SSE Sri UK Karfa, SSE Sri A. Baitha, JEE Md. Shahzeeb and others. The support which we received from Tatanagar Coaching Depot was unmatched and it was their kind cooperation for which we could celebrate the birthday of Steel Express without any glitch.

:: Some Trivia on Steel Express ::

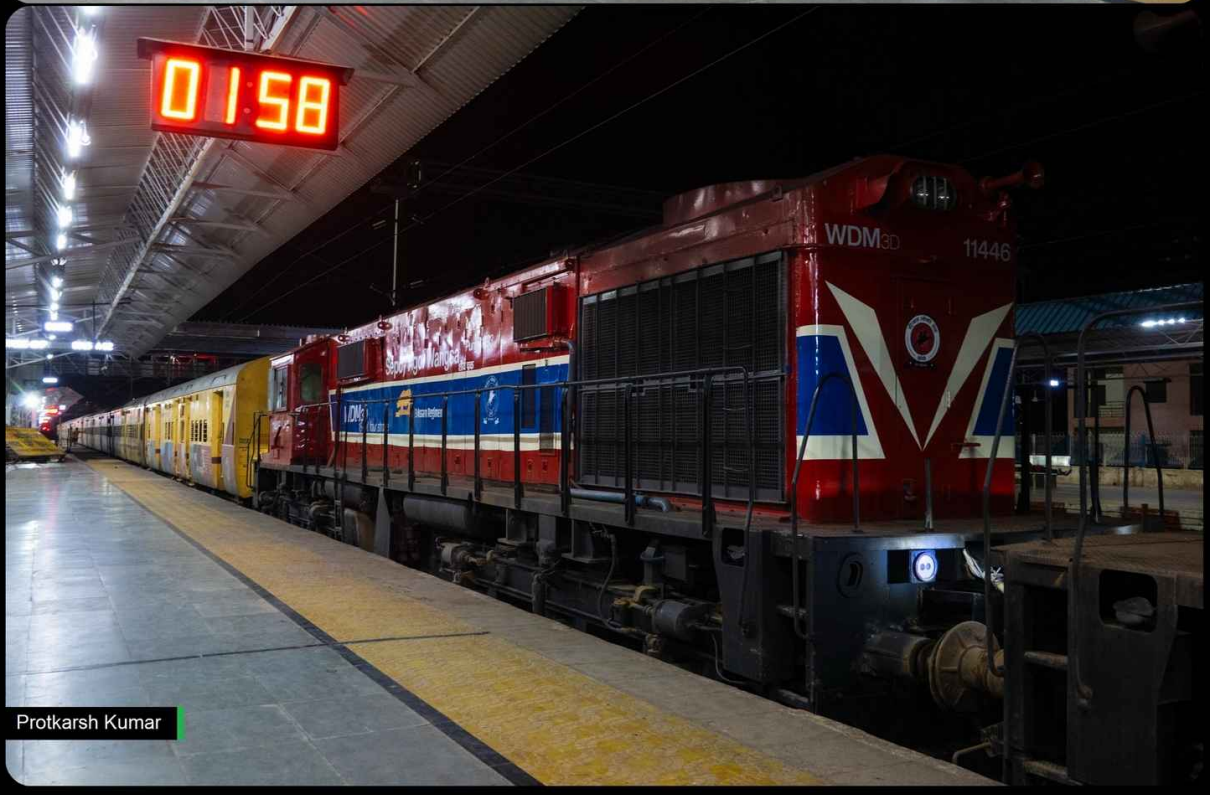
- Steel Express was given TATA Steel branding, for a brief period, on 18th June 2019 by TATA Steel and the theme was 100 Years of Jamshedpur.
- At present, a few coaches of Steel Express are wrapped in Fashion World and Wave International advertisements.
- As mentioned earlier all LHB trains of Tatanagar Coaching Depot flaunts Train Boards designed by Railfans and Steel Express was the first train of Tatanagar Depot which got boards designed by Railfans. Azadi ka Amrit Mahotsav themed board for Steel Express was designed Sayan Debnath and was contributed by Dr. Soham Dev Barman, Vikas Kumar and Shashank Shekhar Swain. It was SSE (C & W) Mr. Manoj and then CCI/TATA Mr. Anjani Rai Sir (currently posted at Ranchi as ACM/PS) who helped us in everything during Azadi ka Amrit Mahotsav (AKAM). Those AKAM train boards were replaced just on the eve of Steel's 55th Year Celebration with the latest ones for the said occasion.

All photographs provided by the author & are copyright protected.
The copy of the old TimeTable courtesy: Sourosankha Maji

Munna Bellamkonda

Photo Junction

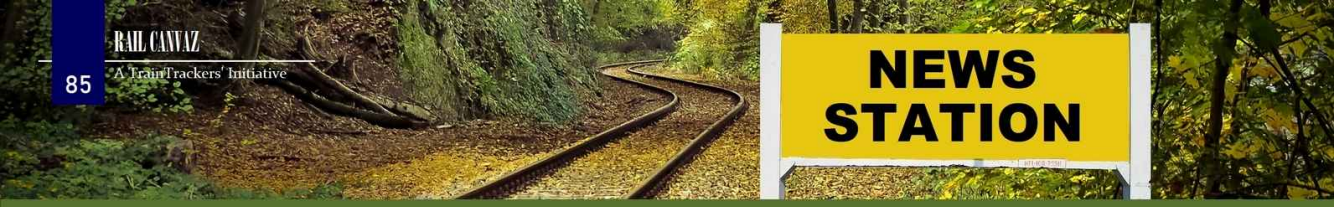
Protkarsh Kumar



Protkarsh Kumar


WDG6G 69087
WDG4 UDL 12953
DAMCHARA
Sumit Nath


WDP4
20042
Dheeraj Rao



125 Years of Parlakhemundi Light Railway

1st April, 2025 marked a glorious 125 years of the first railway line, dedicated to the people of Odisa – the Paralakhemundi Light Railway (PLR). Back then, the Paralakhemundi King Goura Chandra Gajapati Narayan Dev-II had built this narrow-gauge rail line of forty kilometres from Naupada to Paralakhemundi. The coaches were supplied by M/s. Arthur Koppel & Co of Calcutta, who got these assembled from the kits supplied by M/s. Ostenstein Koppel Co. Germany. The locomotives were 'imported' from London by sea. Later, Maharaja Krushna Chandra Gajapati extended it upto Gunupur. To commemorate the occasion, the East Coast Railway (ECoR) celebrated with events at Paralakhemundi Station which included cultural events, exhibitions and competitions for school children, themed "Virasat Se Vikas Tak". The 125th-anniversary celebrations were aimed to recognize the legacy and contribution of PLR towards overall growth of the state.

New Locomotive Manufacturing Shop Dedicated To The Nation

The Hon'ble Prime Minister inaugurated a locomotive manufacturing shop in Gujarat on 26th May, 2025. The locomotive manufacturing shop is set to manufacture 1,200 locomotive engines in the next 10 years in partnership with Siemens Mobility which will also provide 35 years of full-service maintenance. Total order value is approximately Rs. 26,000 crores (approximately), excluding taxes and price variation. The first of its kind locomotive was dedicated to the nation on that day. The key features of these 9000 HP, six-axled locomotives include their ability to carry cargo weighing up to 4500 tonnes based on average load of 40 tonnes and they being equipped with air-conditioning along with toilet facility for the loco pilots. The locomotives attain a maximum speed of 120 km per hour and their maintenance will be carried out at Kharagpur (West Bengal), Visakhapatnam(D) (Andhra Pradesh), Raipur (Chhattisgarh) and Pune (Maharashtra). The locomotives have been given D9 Class and allotted with 55XXX Series. The first two, viz., 55001 and 55002 have been turned out. VSKP(D) will be the home for the first ten ones.

Rake Boost For Kolkata Metro

The Kolkata Metro fleet got boosted by 3 new rakes. On 3rd May 2025, two rakes manufactured by CRRC Dalian arrived Kolkata Port. The rakes MR-507 and MR-509 belong to the 14-rake order placed by Kolkata Metro. The rakes have better cooling and are more spacious with smoother passenger experience than the existing BHEL and Medha rakes. On another front, an ICF made metro rake with CRRC ZhuZhou Locomotive propulsion was dispatched from ICF. The rake is first of its kind and has been allotted with rake number as MR 701. On 19th May 2025, the rake reached Noapara Carshed via DumDum Jn. behind a locomotive through the existing Chennai-Kolkata mainline.

100 Years Of Howrah Division

The Howrah Division of Eastern Railway stepped into the Centenary Year of its existence. To mark the occasion, a WAP7 Locomotive #37357 had been draped in a special livery, mostly hand painted, depicting historic incidents and iconic structures involved with the division. An EMU of HWH CS has also been specially decorated with photos showing the progress in all these glorious 100 years. A book 'Trains, Tracks and Tales', commemorating the occasion was released by the GM of Eastern Railway during the Centennial celebration of the division.

OPERATION SINDOOR

As a community that celebrates the power and legacy of India's railways, Team TrainTrackers salute the unmatched courage, dedication, and sacrifice of our brave soldiers leading #OperationSindoor. Just like the rhythmic strength of a locomotive thundering across our motherland, our jawans carry the spirit of Bharat forward—unyielding, proud and unstoppable.

To the mother who lost her son
To the wife who lost her husband
To the son who lost his father
To the daughter who lost her father
To the father who lost his world
To those who had to leave their homes
To those who had to live without food
To those who put their lives in the line
To those who sacrificed themselves for us
To our ARMY
To our NAVY
To our AIRFORCE

We Bow Our Heads Before Them and Salute the Bravehearts

Proud of our Armed Forces.

Jai Hind. Vande Mataram.


RAIL CANVAZ
A TrainTrackers' Initiative
Inaugural Issue
15th August 2020
CELEBRATING INDEPENDENCE
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THE LOST LEGEND
MG RAILBUS
TREASURES OF ARAVALLI
MAVLI-MARWAR
ABU ROAD
MEMOIRS
NORTH-EAST
CALLING
East-West Metro
Story Behind India's First Underwater Railway
রেল ক্যানভাস
পুজো সংখ্যা - ১৪২৭
মেঘ পিওনের দেশে
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NEGLIGENCE
ON A STEAM LOCO FOOTPLATE
TRAM JATRA
SMALL WONDERS
DHANUSHKODI
A TRACK LOST
ROMANCING THE HIMALAYAS
Trammeling the Trams
LET US SAVE THE ECO-FRIENDLY TRAMS OF KOLKATA
রেল ক্যানভাস
ছোট রেলের ইতিকথা
বর্ধমান - কাটোয়া ছোট লাইনের ইতিবৃত্ত
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Part - II
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Bhakra Railway
রেল ক্যানভাস
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এক ডজন গল্প
বারোটি ভিন্ন স্বাদের গল্পের সমাহার
RAIL CANVAZ
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LAST DAYS OF
PUNJAB STEAMS
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THE LEGACY OF PAMBAN BRIDGE
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