

MEDICAL OXYGEN MANAGEMENT

Medical oxygen is a vital resource in healthcare, indispensable for treating various medical conditions, particularly respiratory illnesses. Efficient management of medical oxygen ensures uninterrupted availability in hospitals, clinics, and other healthcare facilities. This becomes even more crucial during emergencies like the COVID-19 pandemic when the demand for oxygen surges significantly. Medical oxygen management encompasses production, storage, distribution, and administration while addressing challenges and optimizing its use.

Medical oxygen is produced primarily through fractional distillation of air and Pressure Swing Adsorption (PSA) technology. Fractional distillation involves purifying, liquefying, and separating air components, yielding high-purity oxygen. PSA plants, on the other hand, use zeolite molecular sieves to extract oxygen directly from the air, providing a more localized production solution. Both methods adhere to strict quality standards to ensure the safety and efficacy of the oxygen produced.

Once produced, medical oxygen is stored in two main forms: compressed gas cylinders and liquid oxygen tanks. Compressed cylinders are commonly used in smaller healthcare settings and for individual patients, while large facilities utilize cryogenic tanks to store oxygen in liquid form, allowing for efficient use of space. Proper storage practices are critical to maintaining oxygen purity and ensuring safety, as oxygen is highly flammable and requires secure, well-ventilated storage conditions.

The distribution of medical oxygen involves a complex logistics network. Centralized supply chains rely on large production facilities that transport oxygen to hospitals and refilling stations using specialized tankers or cylinder delivery systems. Decentralized solutions, like PSA oxygen plants installed within hospitals, reduce dependency on external supplies, especially in remote areas. However, challenges such as transport delays, inadequate infrastructure, and weather conditions can disrupt the supply chain, making robust planning essential.

Medical oxygen is administered through devices like nasal cannulae, masks, ventilators, and high-flow nasal cannula (HFNC) systems. These devices cater to patients with varying oxygen requirements, from mild to critical cases. Monitoring oxygen saturation levels (SpO2) with pulse oximeters ensures accurate dosing, preventing complications like hypoxia or oxygen toxicity.

The management of medical oxygen faces several challenges. Supply-demand mismatches, especially during health crises, can strain production and distribution systems. Limited storage capacities and inefficient distribution networks, particularly in rural areas, exacerbate the issue. High production and transportation costs further add to the burden, making oxygen unaffordable in underfunded healthcare systems. Additionally, safety concerns surrounding oxygen storage and handling require stringent adherence to protocols.

Viksit Rail Viksit Bharat- 'World class' to 'Best in class'

M. JAMSHED



The Indian Railways, Tiger of India's growth story, is one of the world's most remarkable and little discussed stories of how strategic investments in infrastructure and connectivity

mindful public policy can have exponential dividends for national growth. The progress IR has made during the last decade (2014-2024) could well be its golden period of growth and development, and the system is today, one of the fastest growing Railway networks globally.

So, what did set India's story apart and make it a lesson for countries and regions with similar ambitions for growth? The key was a public policy approach that can be best summarised by saying planning for the railways has been done with Bharat and for Bharat.

This meant recognising that the system must remain both world class and affordable in its essential role as the Railway for the common person, hand in hand with the daily efforts of Bharat's 22.4 million people who use the service daily as a part of their economic lives - and that it must grow in parallel as a system that supports India's industry, commerce, and the ambition of a \$5 trillion economy.

This required revolutionizing the way business is conducted. In the past the railways came under classical criticism for its slow rate of growth, and modernisation and infrastructure capacity saturation etc. It still comes from those who are stuck to the classical archaic mind sets without adequate knowledge e. g. the network growth is often criticised for gradual increase to only 68000 km since 1950, without knowing that the crucial growth for capacity augmentation is of the track kms which have grown to a massive over 132000 km today.

A ten-year broad comparison of its performance with that of the preceding decade proves the point. During 2014-2024, a total of 31000 km of new tracks were laid against 14900 during 2004-2014. Similarly the

cumulative Freight Loading increased to 12660 million tons viz 8473 million tons, IR generated revenue of Rs 18.56 lakh crore against Rs 8.64 lakh crore, Electrification, saving on carbon footprints of over 44000 km against 5188 km, world class Dedicated Freight Corridors of 2741 km against nil in the preceding decade, Production of Locomotives increased to 9168 from 4695 and manufacturing of Coaches to 54000 from 32000. In all parameters of productivity and indices of performance IR has set new records.

Major reform came with the merger of the Railway Budget with the main budget which many boomers with the steam age mindset still miss for no obvious reasons.

The Railways which suffered on account of lack of finances causing thin spread of resources with a huge shelf of pending sanctioned projects, witnessed a focussed inflow of GBS to the tune of Rs 8.25 lac crore during the last decade compared to only Rs.1.56 lac crore in the preceding ten years.

The Railways is soon to have its first train to Srinagar with the tracks to the valley having been completed with some of the highest and tallest bridges and longest rail tunnels connecting the network across mighty mountains.

IR is about to become the first major Railway to achieve 100% electrification for its seamless connectivity, reducing dependence on fossil fuel and hugely reducing the carbon footprint.

Proliferation of anti-collision KAVACH across the railway network is also the largest in a mixed traffic railway system.

Indian trains too are going beyond 'world class'. The Indian Railways has successfully blended advanced global technologies with domestic requirements, aiming for safer, faster, cleaner, and more comfortable trains, keeping the affordability in view to ensure that IR is accessible to all.

Railways with its unique business model bears the losses of the passenger business segment from its freight revenues and yet remain profitable. Major developed Railway systems are either privatised and free to fix higher tariffs or are dependent on Govt subsidies for their losses unlike the IR which takes care of all its operating and working expenses and gets Gross Budgetary Support towards its Capex. Its revenue generation targets, despite

stiff competition from other modes and depending entirely on derived demand, are successfully achieved registering record performance year on year.

This might come as a surprise to boomers and '90s kids who recall a humbler era in India. Anything labelled "export quality" used to be priced at a premium, with the best products—described as world-class—reserved for affluent nations in Europe and America. Indians were often provided with substandard goods or services under the guise of some misplaced socio-economic thinking. Generations were compelled to lower their expectations, even for crucial services like the Indian Railways.

However, the post-2014 focus of the Govt. has adopted a determinedly progressive and persuasive approach toward development and infrastructure creation. Modern India deserves a national transporter free from the lack of innovation and a conservative inward looking agenda.

This progress has been achieved while maintaining high levels of localization for essential railway components and scaling up manufacturing facilities to unprecedented levels. Although Vande Bharat trains and their variants attract significant attention, a deeper dive into the Indian Railways' priorities reveals substantial efforts in several other areas.

India is now set to roll out the world's most powerful hydrogen trains in the coming months. The development of these 1,200-horsepower (HP) locomotives can be likened to Operation Smiling Buddha, which placed India on the global map as a nuclear superpower. Remarkably, India is now leading the curve, far surpassing "developed" nations, still struggling to create hydrogen trains that are half as powerful. To ensure maximum safety, Germany's TÜV-SÜD has conducted a third-party audit of India's hydrogen trains.

With the establishment of the world's longest hyperloop test facility, India is emerging as a global leader in the future of transportation. After successfully completing a 422-meter test track in December 2024, the country is now preparing to build a nearly 50-kilometer test track to assess the commercial feasibility of hyperloop travel.

Agreements have been signed with Elon Musk-backed SwissPod and France's SYS-

TRA. Through international collaborations and increasing global recognition, India is among a select few nations making significant strides toward creating a commercially viable hyperloop system, cementing its status as a technological powerhouse.

Even China has embraced the 'Make in India' initiative, with CRRC India actively supporting localization efforts for the Bangalore Metro. The Chinese firm is achieving over 75% local manufacturing of metro coaches, with 50% of the content sourced from India. CRRC aims to increase localization to 90% in future projects. Additionally, by positioning itself as a global hub for CRRC, the facility is poised to handle export orders to West Asia and Africa.

While bullet train rolling stock supply deals with Japan are being finalized, India has already embarked upon domestic manufacturing of high-speed trains. Beyond rolling stock, Plasser India, a subsidiary of the Austrian company Plasser & Theurer, is transforming railway maintenance and construction with its track machines. Their local manufacturing efforts promote self-reliance while supporting global exports.

Indian railways have also embarked upon ambitious projects to connect not only South Asia by Rail with its 'BBIN initiative' but has also envisioned connecting India with ASEAN under its 'Act East Policy' in the East and with 'IMEC initiative' it is planning to connect India with Europe by a Rail-Sea - Rail corridor.

Its PSUs are undertaking export of rolling stock, track infrastructure works and provide consultancies in many Asian and African countries.

With its new trains, modern stations, faster speeds, dedicated freight corridors and high speed network, Indian Railways is now a major world class railway system and its story is one India can take to other countries that have not yet fully leveraged the critical role of the railways in catalysing national growth. Viksit Rail Viksit Bharat motto is not to wait and witness a transformation by 2047, for Indian Railways - it is a continuous journey for Bharat and with Bharat, with records, progress and growth milestones being set daily.

(The writer is Distinguished Fellow at CRF and Former Member Traffic Railway Board)

GAYATRI SINGH CHARAK

A bird flies not when it is simply taught to, but when it actually spreads its wings"

We are the future of the nation, the new world, and yet our wings are being snatched away from us. What are these wings? Education. The only thing which can make us fly to great heights has been compromised, diluted, and then given to us.

The question is not about who is

responsible, but it is about why is it so? The New Education policy, if we talk about, launched by the Indian government recently listed so many key areas of modification. But was it implemented considering it as the future of the new minds? No, it was implemented soullessly just like any other chore by the people in power.

We say we want to become like the west; sophisticated, developed, educated, self-reliant and employed. But we never real-

ly took enough time to stop and realize what wrong has been going on in the education system of India. If a child wants to pursue Philosophy and chemistry, or he or she is considered irrational, just because these subjects don't form a perfect combination. This is the very problem with our education system. Had that child opted for both the subjects and pursued them, he would possibly have become a philosopher or a scientist (as in the best-case scenario), which would indirectly be ben-

eficial for the whole country. But there is not enough trained and professional faculty in the schools who can provide for the same, neither is there such a structure where kids are free to choose whatever they want to pursue. One might love Physics but doesn't want to study Chemistry, instead wants to study History. For such a child, there isn't even 0.001% possibility to achieve what he has in mind.

There is nothing more stressful than the

life of a student studying in high school, fragile with his/her dreams and uncertain about what is yet to come. What makes it worse is the system of education, here in India. There is so much to memorize and to theorize, that kids have zero skill in their own opted subjects. We ask why there is so much unemployment, and then blame it on the government for not providing adequate jobs. But did it ever cross our mind, that if schools would be considerate enough to teach theory as well as

skill, then we wouldn't even be whining about jobs. We would have enough knowledge as well as the Skill to work it all out ourselves. So, the question therefore is not about who is responsible. The question is that do we want to send our kids on suicide missions where they are unsure of their future, or do we want to change this age-old system and achieve the very virtue of a developed nation? "The birds will fly only if the plight of their wings is being looked upon".

Chinar Trees of Kashmir: Timeless Guardians of Beauty and History

PUPU JI KOUL

The leaves of Chinar trees in Kashmir during autumn season turn into yellow, red and fall from the trees and also turn earth below yellow and red. It is a sight worth seeing and beautiful and tourists as well as the local Kashmiris take great pleasure in observing the chinar tree and the land beneath it turning yellow and is a good sight to see. For centuries the Chinar tree has attracted and inspired Kashmiri poets. See the Chinar garden at Dak Lake in Srinagar, children are seen playing cricket on fallen Chinar leaves. In the same garden some people are seen collecting fallen yellow leaves of chinar trees and burning these to get charcoal for winter which is used in Kangri-the firepot during for warming purpose. The tourists in large numbers visit Kashmir during the autumn season as the climate is neither so cool, nor so hot and the leaves of Chinar trees turn yellow and fall from the tree to cover the land beneath into yellow and golden color and it is a sight worth seeing. Tourists are busy in taking selfies to post these on social media. It is in October and November that the Chinar gardens are visited by large number of visitors and tourists as Chinar tree changes colors from green to blood-red, mauve, amber and yellow in two autumn months of October and November. Che Nar means what fire is a Persian name and Chinar trees are believed to be native of Persia. It is said that Mughal ruler Jahangir during his rule that is (1605-1627) brought these from Persia and got them planted on large numbers across Kashmir. However some say that the Chinar tree existed in valley before the Mughals. Kashmir has Chinar gardens in Srinagar, Anantnag and Ganderbal which are frequented by the tourists more in autumn season. Moreover the Chinar trees are found across Kashmir valley from cities to villages.

The Chinar trees provide its shade during summers and one finds calm, peace and cool breeze under the Chinar trees. The Chinar tree - Platamus Orientalis is a species of



plane tree native of the eastern Mediterranean region and western Asia. It is a deciduous tree that grows up to 50 metre - 160 foot tall and has a wide, spreading canopy. They are also long lived, with some specimens living for over 200 years. The bark of the Chinar tree is smooth and pale grey. It is known for its large, bright green leaves and stunning autumn color, with leaves turning shades of orange, yellow, and red in the fall. The tree produces clusters of small, greenish flowers that give way to round, green fruit that turns brown when ripe. Chinar trees are known for their resistance to draught and extreme temperatures and are often planted as ornamental trees in gardens and parks. They are also used as shade trees along streets and other public places. In some parts of the world, the Chinar tree is considered a symbol of peace and prosperity. Chinar trees are popular ornamental plants often used in landscaping and public parks.

There are several varieties of the Chinar tree, including Morton circle. This variety is known for its large, rounded canopy and is popular in urban landscapes. Bloodgood - this variety has dark red leaves and is prized for its ornamental value. Emerald Queen - This variety is known for its fast growth rate and

deep green foliage. Liberty - This variety is known for its resistance to pests and diseases and is often used in commercial landscaping. Majestic Beauty - This variety has a paramedical shape and is known for its large size and attractive foliage. Autumn Chinar - The leaves of the Chinar tree, with deep green shade in summer, turn to vivid orange and red during autumn. The Autumn chinar makes for a breathtaking sight in Kashmir during the autumn season. The other varieties are Kashmiri icon - The Chinar tree has great significance in Kashmiri culture and represents Kashmir's natural heritage. The tree is often depicted in different forms of art, poetry, and literature. Besides its natural beauty, the Chinar tree also provides shade to locals. The changing colors of the Chinar leaves marks the arrival of the autumn /fall season, which is known as Harud in Kashmir. Some other varieties are Iconic foliage, Giant canopy, and Regal beauty. The Chinar tree, also known as Chinese Banyan or Platamus orientalis, is deciduous. It is known for its distinctive, fan-shaped leaves and beautiful, exfoliating bark. Chinar trees are valuable and beneficial to any landscape or community, providing various environmental, aesthetic, cultural, and medicinal ben-

efits. It is known for its distinctive, large, umbrella-shaped canopy and deeply furrowed bark. Planting Chinar trees have several benefits to people.

It has environmental benefit, aesthetic value, historical and cultural significance, and has medicinal properties. The Chinar trees also provide a habitat for various wildlife, including birds and small mammals. The Chinar tree is not considered toxic to humans or animals. It is generally safe to plant and handle, and there are no known adverse effects associated with its use. The leaves of the Chinar tree, with deep green shade in summer, turn to vivid orange and red during autumn. The Autumn Chinar makes for a breathtaking sight in Kashmir during autumn season. It is towards the end of autumn in November; the Chinar trees change their color from green through crimson to yellow. Children run around excitedly, trampling leaves and playing cricket under the shade of the mighty Chinar trees which goes vibrant with colors of red, golden yellow and combinations of both in this season. In brief the Chinar trees in autumn season change color of its leaves from green to yellow golden and red and its sight is very pleasant to the eye and attracts large number of tourists and other people.

Wonderful Winged visitors

GL KHAJURIA

Aristotle, the world renowned philosopher had more than two thousand years back had known how the Avian (Bird) migrate with seasonal changes but in fact it was in Mazzy, 1822 a day of bewilderedness for ornithologists that during this period they observed that a stork with its neck pierced was caught in Mecklenburg, Germany. In fact this stork with arrow had come from Africa and established for the migration though the fact goes that there are references in Sanskrit, by the Greek Philosopher in the old testament and allied scriptures. In line with supporting fact, The German emperor Friedrich (1194-1250 AD) Observed South bound flights of bird crossing Mediterranean sea during winter.

The migration of birds is normally effected with the change of season and the birds have the record of flying over thousand of km and find the same locations where they had built their nests or habitates a year before. Why do birds migrate is a matter of mystery. After deep thought, it was established by the ornithologist that the migration triggered is to escape from cold, seek food and to choose new breeding grounds. And of all these birds, the most ones are those who don't feel eagerness of migration despite the impending cold or weather changes that take place.

Ornithologists establish that out of around 8-10 thousand species of birds those inhabit this planet, two third are migratory and strangest fact is that these fly too high mountaneous regions like that of Himalayas or so. The Siberian crane is a regular migratory bird from Siberia to India flying long and hazardous routes.

After a great deal of studies ornithologist have established that American golden plover (pluriallis) flies from Aractic to South America covering a long stretch around 7000 kms or so. The Red Throated humming bird barely 10 inches of size flies about 2500 Kms from Canada to Florida and the swallow (Hirundin) measuring about 10-15 cms migrates covering a distance around 7000 Kms from Europe to South Africa crossing over Atlantic. The Northern pintail duck (Anas acuta) and garany duck (Anas quequedula) which breeds in the Siberian tundra and taiga cover long long distances during their migration.

Similarly, the birds inhabiting in Delhi zoo also migrate long distances with the change of climate for food and finding new ground apart from 1200 species which are spectacular and inspiring. The Bharat-purbirds sanctuary is a paradise of magnificent birds and same is with wildfowl refuge in Rajasthan which is barely 26

sq Kms in area and much of its area is marshy, besides the cover of woods. It is nodenying the fact that the domesticated pigeon can obviously find its way home after having been shifted to unknown strange place or location. Similarly, it was experimented with wild manx shearwater, taken from its nest off the sea coast of UK and released in Boston USA. Surprisingly enough, the bird returned or navigated or to say avigated to its original habitat. The avigation of bird-shave been studied using advanced technology like radar, keeping the birds in planetarium, putting bands of light metal etc and the studies have shown miraculous results.

Ornithologist have established that birds navigate not only with the help of sun but these also pursuit or take cue from the position of stars of night sky. The German biologist FA Schneider established that the bird navigate with the help of sun in 1996.

Stephen T Emin, professor at cornell university conducted detail studies to ascertain as to how the bird could orient the visibility of stars correctly. In his experiment, he turned off the light in the planetarium where birds were kept. Emin and other observers found that the birds fluttered aimlessly revealing that they took the celestial bodies if sky is their guide.

The ornithologists are not in consonance with the outdated idea that the birds are guided by the Earth's magnetic field or that of gravitational field. In the experiment so conducted, the birds were put in a strong magnetic field with magnified plates attached to their wings and resultantly revealed insensitiveness to electromagnetic field or the result were inconclusive.

According to some researches, the birds, however can synthesize a magnetic compound capable of indicating the earth's magnetic field.

It is astonishing to note that the avians are capable of forecasting weather conditions and their changes. Studies on pigeons have shown astonishing result that these can see polarised light and ultraviolet light. The birds, in fact, can hear infrasound (noise in ultraloud frequencies which carry vast varied distances). As a corollary, it has been attributed that birds do not live in sensory world as we human do.

The birds during the course of long distant migration are having very sharp and keen eyesight. Physiologically their body weight is low as the skeletal structure is hollow whereas the pectoral muscles are strong enough to take long flights. Besides, the respiratory system is well adopted to meet up their metabolic activities involved during their long in that distance flights.

(The author is Former Dy. Conservator of Forest, J&K)