L&T Metro Rail
Hyderabad

HYDERABAD METRO RAIL

METRO AND MORE

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The Hyderabad Metro Rail has pulled together the experience of cities across the world to create a mass transport system that suits India

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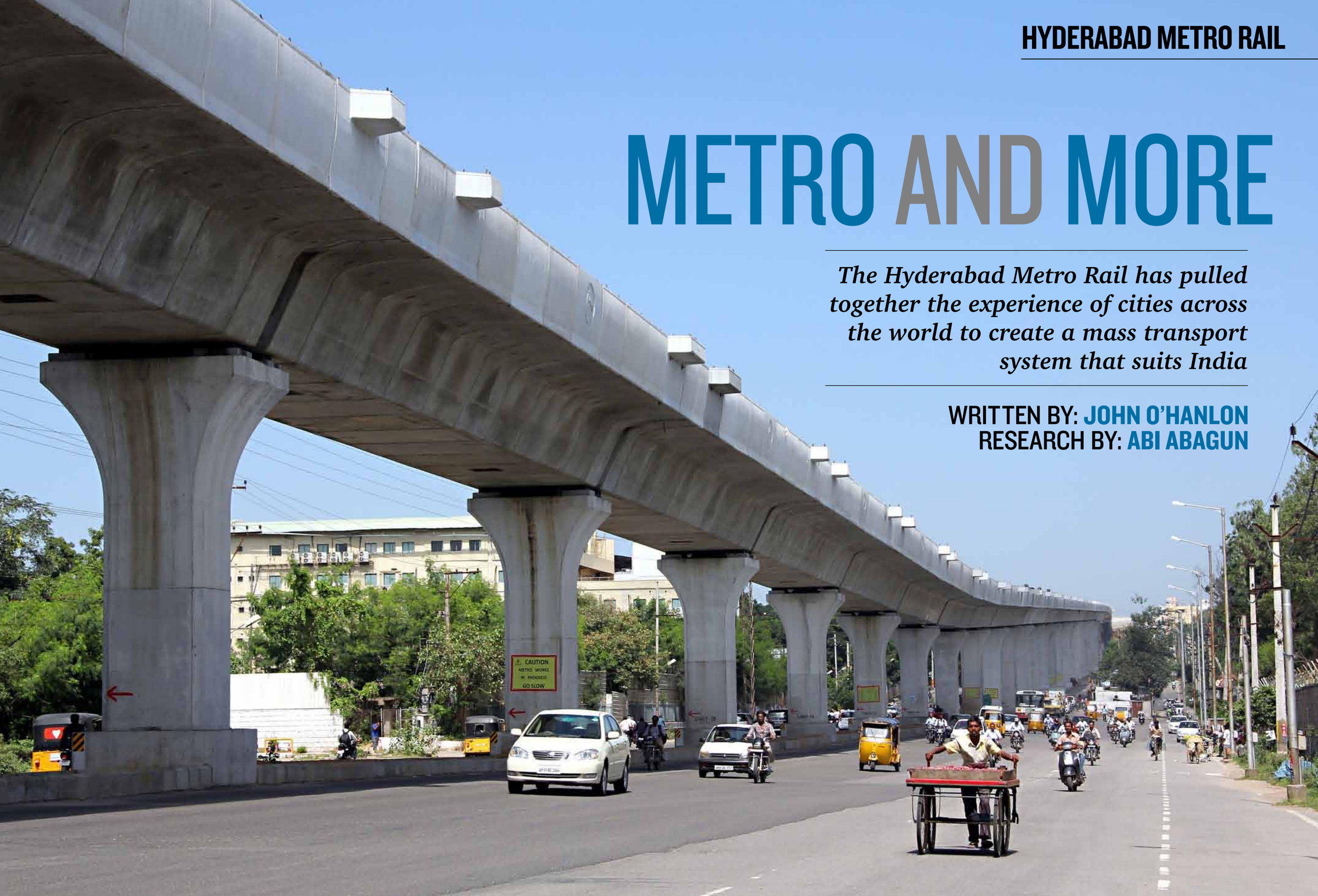

Aesthetic construction of Hyderabad Metro Rail elevated viaduct

HYDERABAD METRO RAIL

Hyderabad, the capital city of Andhra Pradesh, sits on the banks of the Musi River to the north of the Deccan Plateau. With a metropolitan population approaching eight million people it is the fifth most populous city in India. India's cities generally experience the same challenges of traffic, pollution, pressure on services and the like as those in other parts of the world, but they have their unique characteristics as well according to the Managing Director of Hyderabad Metro Rail Limited NVS Reddy. For one thing, they tend not to have sidewalks – life at ground level can be chaotic!

That's why it was a good idea to devise an elevated rapid transit system for the city. Congestion was bad, and the lack of transport efficiency of this city, which is a powerhouse of India's burgeoning pharmaceutical and IT sectors, was holding it back. The project was initially launched in 2008 as a pubic-private partnership (PPP), the largest in the world. In 2010 following an abortive initial bidding round, the Concessionaire (Design, Fund, Build, Operate & Transfer) contract was awarded to Larsen and Toubro, India's largest, most respected and diverse engineering, construction and infrastructure organisation. Chief Executive & Managing Director of L&T Metro Rail (Hyderabad) Ltd (LTMHRL) is Vivek Bhaskar Gadgil, who is clear about the challenges of delivering such a massive project but along with Mr Reddy, delighted that it was awarded the accolade of "Global Engineering Project of the Year" at the Global Infrastructure Forum in New York earlier this year.

Hyderabad Metro Rail cantilever type station

The project is based on the public-private partnership Model (PPP) and uses a highly innovative financial structure that calls for very little in the way of public funds. Out of a total investment of the equivalent of $2.6 billion the Indian government provided ten percent in the form of viability gap funding, the remainder coming from equity put in by L&T and bank loans. The government of Andhra Pradesh through its Public Sector Enterprise (PSE) is spending another $33 million on land acquisition, road widening, relief and rehabilitation. Apart from that there will be no more public funds: L&T is carrying the remaining risk, its return coming from fares, rental from developments around the stations, and advertising. It will enjoy this for a concession period of 35 years, which is extensible by another 25 years after which the entire project will revert to the government.

NVS Reddy is the driving force behind the project from the government side. A financial heavyweight with many infrastructure projects under his belt, Reddy has travelled the globe to assess the success or failure of their solutions to similar problems. "We are not simply building a metro here in Hyderabad: I want to make use of this opportunity to redesign Indian cities as eco-friendly, people-friendly cities. We have the latecomer

72KM

Track length in Phase I

Launching Girder – State of the art construction equipment used to build elevated viaducts of Hyderabad Metro Rail

advantage: I am able to avoid the mistakes and emulate the best practices!"

He was deeply impressed by the work of Mayor Enrique Peñalosa in Bogotá. "He completely transformed what used to be one of the worst cities in the world and made it one of the best. He created quality public space, provided good connectivity and introduced bicycle stations at the bus stops. I am going to do that in Hyderabad." He went to London (where you are never more than five minutes' walk from the tube) and Paris to see what can be done about congestion, but found closer benchmarks in Singapore, Hong Kong, Taipei and Bangkok, where he learned lessons from the BTS Skytrain, an elevated metro like the one being built at Hyderabad. "Having built it they saw its full potential was not being realised: then, taking advantage of the height above road level they built skywalks below the tracks that straightaway became a landing to connect the stations with adjacent facilities, whether retail, entertainment or educational. It made Bangkok an efficient city."

Hyderabad's Metro Rail grasps that concept from the outset. The tracks are approximately 8.5 metres above road level; the clearance required for road traffic is 5.5 metres. The remaining three metres is people space, he says. "In that gap I am going to build skywalks giving access to schools, colleges, hospitals, residential complexes and commercial complexes so one does not have to go down into the roads." Unlike many of the other 200 or so mass transit systems in the world Hyderabad will have built in intermodal connectivity, rather than having to have it retrofitted.

Because the Metro, he points out, is just part of a much larger vision for the city. "Phase I, the current work in progress, is a 72 kilometre stretch, with 66 stations and three depots, while Phase 2 will see a further 75 kilometres built. The system connects with existing main line stations, and bus depots, and will link to a new bus rapid transport (BRT) system throughout the city as well as being supported by bicycle lanes – and of course the skyways. Far from a simple metro it is part of a complete urban redesign that will transform Hyderabad into a people-friendly, green city. Reddy has one eye on Singapore's 'one-hour city' concept where no journey within the metropolis should take longer than that time.

> "WE HAVE THE LATECOMER ADVANTAGE: I AM ABLE TO AVOID THE MISTAKES AND EMULATE THE BEST PRACTICES!"

$2.6 BILLION

Overall investment in the project

The depots and stations will become hubs of economic, social and educational activity in their own right. "I am building a symbiotic relationship between the property developers and the ridership," says Reddy. "The stations and surroundings become destinations. Malls, multiplexes, theatres, restaurants and food courts, social spaces – everything people want should be available near a metro station. It will bring down congestion at road level."

Now that it is fully under way, the whole project should be complete by 2017. More than a third of the 2,500 single pillars rising

Aerial view of the Hyderabad Metro Rail Mother Depot

> "EVERY CITY HAS ITS 'APPETITE' AND WE HAVE TO GET THE BALANCE RIGHT BETWEEN OFFICES, MALLS, MULTIPLEXES AND THE LIKE"

from the central reservation of the roads have been built. The eight kilometre test track and the 'mother depot', the eventual control hub at Uppal, should be completed by the end of 2013 ready for the rolling stock and advanced signalling systems to be trialled by the end of 2014.

The Concessionaire's task has been as onerous as that of redesigning an old and intractable Indian city. L&T's first achievement though was in securing the contractual and financial arrangements in record time, says Vivek Gadgil. In this L&T's clout with the ten nationalised banks involved was a key element. He then had to bring together a team of consultants from around the world, something that was negotiated with resounding success. The last major contract signed earlier this year was with Otis Elevator Company (India) Limited, for 670 elevators and escalators, its largest ever contract. Now 96 percent of contracts have been granted.

Almost all the high tech equipment has to be imported, making procurement a risky business, much of it outside of L&T's control. Nevertheless he has made some smart moves. "We were lucky in that I was able to close two large contracts in Indian Rupees." This gives greater predictability on two large, fixed price contracts from Korean suppliers Hyundai Rotem and Samsung. These companies are responsible for the rolling stock and the automatic fare collection system (AFC) respectively. Other key suppliers now on board are Thales Canada for the signalling and communications equipment, Tata Corus for the rails, Vossloh for the rail fastenings and Voestalpine for the points and crossings.

Engineering challenges included untracked underground utilities and the selection of the best signalling systems. The Metro will run on the latest communication base train control (CBTC) signalling system, the first time a purely wireless system is being installed in India. Since this is the first time the Commissioner of Railways, who has to permit the system for commercial use, has seen it, it has been necessary to support that office every step of the way with information and data says Gadgil.

Actually, all this is great stuff for Larsen &Toubro, whose engineering ability has been proved time and again since its foundation in Mumbai in 1938. Delivering a megaproject like this will only enhance its reputation and bring in more infrastructure

work in the region. But the PPP model carries more risk than cash contracts. In theory 'transit oriented development', the construction and lease of a huge portfolio of commercial property on land provided by the government should pay back handsomely over the concession period: in practice, this is notoriously unpredictable territory.

For example if more office space than the market can bear suddenly becomes available, rental levels will fall. "It makes it different; it also makes it difficult. We are going to construct the Metro over five years but 18.5 million square feet of commercial development takes much longer. I am not talking about the physical constraint but the business constraint: every city has its 'appetite' and we have to get the balance right between offices, malls, multiplexes and the like."

Whatever the problems though, VB Gadgil and NVS Reddy share the palpable excitement of making Hyderabad one of the world's most efficient cities. It's a nettle that must be grasped, Reddy emphasises: "India is still only 35 percent urbanised. Even in the towns only about two percent of the people have cars. So the car will be a nightmare for Indian cities: we need to advance the public transportation model and make all the human needs available near the metro stations and depots to have any hope of controlling congestion." BE

Top view of the Hyderabad Metro Rail elevated viaduct construction

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