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Steel & Power



Dilip Oommen,
CEO, ArcelorMittal
Nippon Steel India

THE REALITY ABOUT REALTY

Amid the global housing crisis and layoffs initiated by big tech, investors are trying to ascertain the state of real estate sector in India, is it boom or kaboom!

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COVER STORY THE REALITY OF THE 'REALTY BOOM'

Amid the global housing crisis and layoffs initiated by big tech, investors are trying to ascertain the state of the real estate sector in India, is it boom or kaboom!



Photo: For representational purpose

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Material Handling Equipment

CW explores how automation kits can bring productivity gains to material handling, besides ensuring safer operations.

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BAUMA CONEXPO INDIA 2023

An Equipment Galore

The recently concluded bauma CONEXPO INDIA in Greater Noida focused on sustainable technologies and experienced the largest ever domestic participation compared to previous editions.

- ACE
- Ajax Engineering
- BKT Tires
- Caterpillar India
- Cranesafe Technologies
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- Gurugram real estate to soar with launch of new Delhi-Mumbai Expressway
- Nearly 25 million sq ft mall space to be added in the next 4-5 years
- Cement demand to continue uptrend with 7-9 per cent rise next fiscal
- Railway to play a key role in developing the nation: MOS, Railways
- Embassy REIT raises debt of ₹10 billion from Bajaj Housing Finance
- Use of plastic waste mandatory in road construction

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The Joshimath crisis in Uttarakhand appears to be the result of unplanned development, absence of drainage and tunnelling activities.

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"Any project with a strong technology component is of interest to us."

Vinayak Pai, Managing Director, Tata Projects

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Fuelled by Hydrogen

Murali Ramakrishnan Ananthakumar and **Dr N Rajalakshmi** delve into the role of green hydrogen in the construction industry.

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"The smart city has completed six major smart roads, awarded at ₹461.5 million."

Veereshakumar, IAS, Managing Director & CEO, Davanagere Smart City

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SPECIAL PROJECT

Metro Via Water

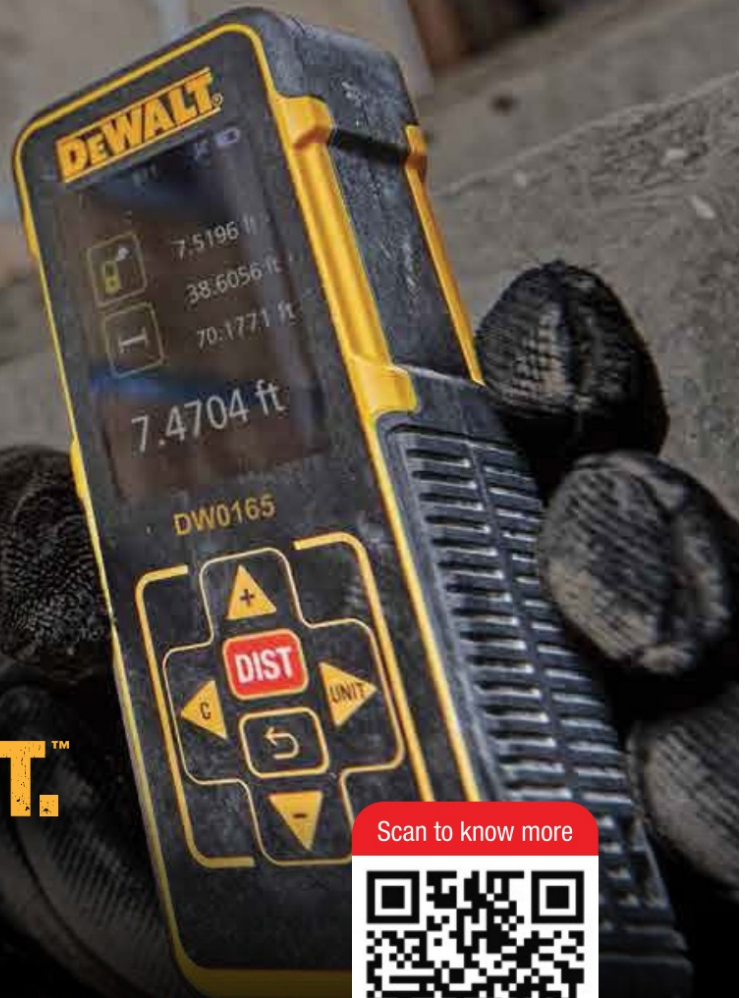
Work on Mumbai's first metro viaduct over a water body was completed in 123 days. Read on to know more.

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In the April 2023 edition, look out for:

- Defense Infrastructure • Safety and Security
- Waterproofing • Roofing and Cladding

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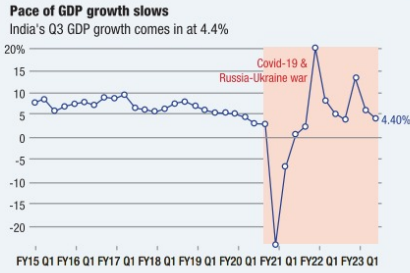
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EDITOR'S NOTE

THE TIMES THEY ARE A-CHANGIN...

The ideas of March are here again and the song by Bob Dylan seemed apt to describe the scenario instead of using the overused cliché called *Disruption*. India's economic growth rate slowed to 4.4 per cent in the December quarter.



High input costs have driven profitability down, especially for the manufacturing sector. However, construction grew by 8.4 per cent against 5.8 per cent in the previous quarter.

Sector-wise performance
Quarterly Estimates of GVA at Basic Prices (at 2011-12 Prices)

Sector	% change in price (Q2)	% change in price (Q3)
Agriculture, forestry and fishing	2.4%	3.7%
Mining and quarrying	-0.4%	3.7%
Manufacturing	-3.6%	-1.1%
Electricity, gas, water supply and other utility services	6.0%	8.2%
Construction	5.8%	8.4%
Trade, hotels, transport, communication and services related to broadcasting	15.6%	9.7%
Financial, real estate and professional services	7.1%	5.8%
Public administration, defense and other services	5.6%	2.0%
Private final consumption expenditure	59.5%	61.6%
Government final expenditure	8.6%	8.7%

Will India remain immune to global volatility? Although the World Bank and other agencies seem to think the country would be able to withstand these shocks with greater ease, past experience indicates that this elation of decoupling does not last very long as global headwinds catch up. The economic scenario is at inflexion point when inflation is just about beginning to win the battle against growth. So far none of the indicators are showing any worrying signs. But while commodity prices have eased, they are yet above pre-pandemic levels. Interest rates are increasing across the world and rates in India are now reaching a point where they will begin to hurt housing demand.

Recently, Irfan Razack, Chairman, Prestige Estates, expressed that he wanted to double his annual residential bookings in three years to ₹250 billion, mostly from his current markets like Bengaluru, Mumbai, Hyderabad and Chennai. Given that the real-estate market performed extremely well in 2022, his optimism, despite increasing

interest rates, is due to the changing profile of the industry. India's millennials, who comprise 34 per cent of the population, number close to 440 million. They are not waiting for eternity to buy their first house as was the trend two decades ago. In over 20 cities, metro rail has begun to draw fresh contours to the exiting cityscape, thus energising property markets. New properties with amenities are meeting the aspirations of the millennials. Incentives like lower stamp duty are good triggers for fence sitters. Easy availability of finance allows nuclear families to branch out from traditional joint family units. Job mobility has sown the seeds of independent nuclear units and availability of rental units eases the process to home ownership.

Union Minister Nitin Gadkari announced that his target is to complete 200,000 km of National Highways by 2025. This means he plans to complete 60,000 km of road construction in three years which, at an average of 20,000 km per year, would mean a rate of construction of 55 km per day for three consecutive years! Past experience shows that it was only in 2021-22 that we managed to construct at the rate of 37 km per day, which is the highest we have managed so far. This year is the best chance to meet this target of 20,000 km before the country slips into election mode.

Decarbonisation has become the mantra for the cement and steel industry and efforts are being made to adopt energy-efficient processes. The construction industry also needs to think along this line. The Securities and Exchange Board of India (SEBI) has mandated the top 1,000 listed companies by market capitalisation to make filings as per the Business Responsibility and Sustainability Reporting (BRSR) from FY23. In FY22, over 175 companies reported on the BRSR framework on a voluntary basis. Companies observing these ESG guidelines will qualify for preferential investments and may even be spared from carbon tax.

Pratap Padode

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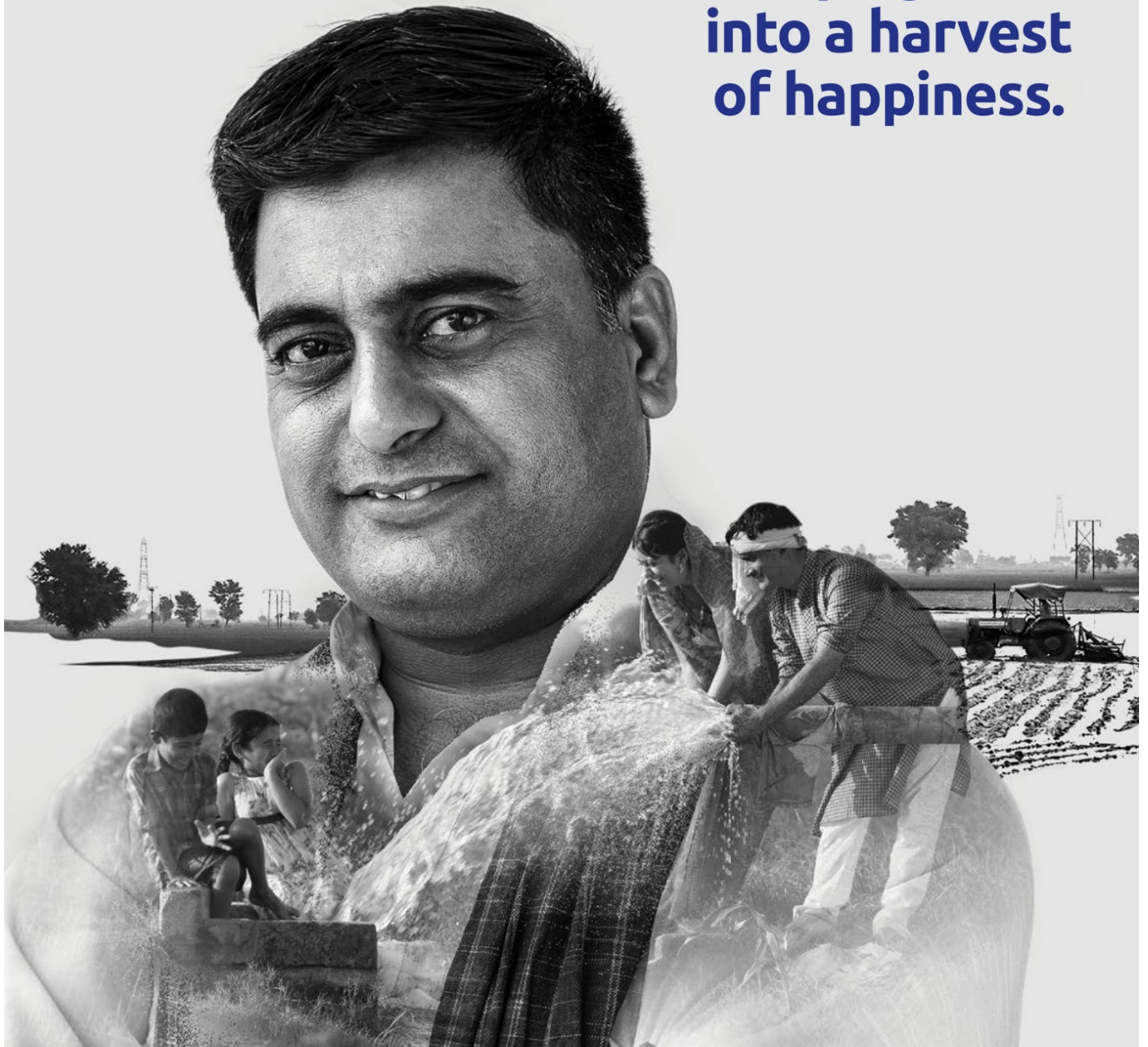
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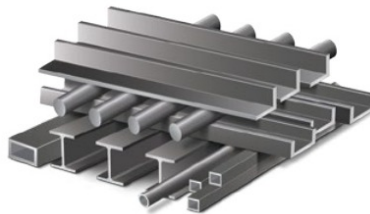
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NEWS & EVENTS

- Colliers has been Great Place to Work Certified in India (from February 2023 to February 2024). This re-certification is a testament to the Colliers culture of equal opportunity, diversity and learning.



- Aiming to provide skilled professionals in the backdrop of the regulated real estate sector, Lamrin Tech Skills University joins hands with Vineet Nanda to launch the 'Stellar School of Real Estate.'
- Square Yards has launched its Real Estate Metaverse that allows users to explore the real estate on a digital twin of an entire city, visualise the neighbourhoods in a 3D built environment and walk in as an avatar interacting within a collaborative marketplace.
- Four municipal commissioners of Mumbai, Pune, Nagpur and Thane will hold the chairman position of the Maharashtra

government's programme 'Chala Januya Nadila' (Know our River). This programme aims to improve the health of the rivers in the state.

- Normet has opened its largest production hub outside of Finland in Jaipur. The facility covers 10 acre including a 150,000 sq ft factory and amenities area and a 23,000 sq ft office area.



- Vedanta Aluminium has introduced Robotic Process Automation (RPA) in its commercial function. This will provide data via tracking of various parameters on a real-time basis.
- Hindware has launched its experiential store, Lacasa, in Kerala. It will offer real-time experience of the bathware, lounge and tiles product offerings from Hindware, Hindware Italian Collection, Queo and Hindware Italian Tiles.

APPOINTMENTS

- The Board of Mahindra Lifespace Developers (MLDL) has announced Amit Kumar Sinha as the Managing Director and CEO designate from May 23, 2023.
- Gujarat Ports Infrastructure has appointed Madhvendra Singh as the first CEO of the Gujarat Maritime Cluster.
- Colliers has appointed Ruchika Choudaha to lead the Office Services business in Pune. An accomplished real estate professional, she comes with over 13 years of experience.
- Vitra has appointed Tirthankar Sarkar as the new Senior Country Manager of Vitra Bathrooms India.

EVENTS

- The Ministry of Coal organised the east zonal conference on PM Gati Shakti and National Logistic Policy. The event included in-depth discussions for inclusive growth of the region.
- GROHE, under the aegis of GROHE Intellekt, organised #TechTalk. The initiative inspired and educated architects and designers of new age technologies.

AWARDS AND RECOGNITION

- Dr Brijesh Dixit, Managing Director, Maha Metro, has been conferred with the Distinguished Alumnus Award by the National Academy of Indian Railways, Vadodara. He was awarded for his illustrious career in the Indian Railways and also for his contributions towards the efficient implementation of large-scale Urban Transport Projects.



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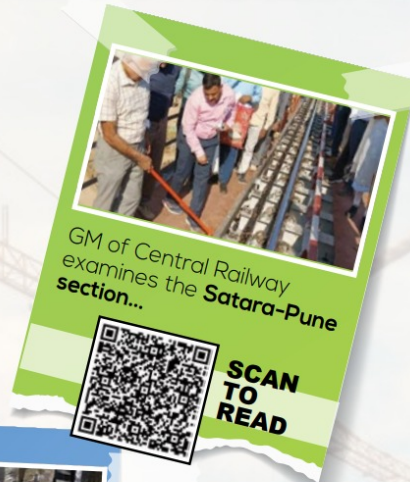
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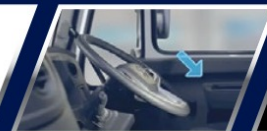
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CURRENT AFFAIRS

Gurugram real estate to soar with launch of new Delhi-Mumbai Expressway



The Delhi-Mumbai expressway is expected to be a game changer in India's infrastructure landscape, with significant ramifications for the real estate market. The expressway is being built as a high-speed corridor, with maximum speeds ranging from 80 to 120 km per hour. Moreover, Sohna, Gurugram, New Delhi, Faridabad, Palwal District, Kota, Vadodara, and many other cities along its route are predicted to witness substantial expansion.

Pradeep Aggarwal, Founder & Chairman, Signature Global (India), has said, "The launch of the Delhi-Mumbai Expressway will have a cascading effect on the property prices in Sohna and New Gurugram. Consequently, the demand in both residential and commercial segments is expected to increase significantly in these regions. With Signature Global properties developed near the Delhi-Mumbai Expressway, we are confident that these appreciating property prices will be leveraged to further attract new prospective homebuyers. We anticipate that social infrastructure developments around the expressway will have a multiplicative effect in

bolstering the Indian economic growth story."

Santosh Agarwal, CFO & Executive Director, Alpha Corp, has said, "The Delhi-Mumbai Expressway is expected to boost the real estate in Gurugram. The new expressway will provide faster connectivity between Delhi, (from Gurugram Expressway and Sohna on the Dausa end) Jaipur, and Mumbai, reducing travel time and making Gurugram a more attractive location for businesses and residential development. The improved infrastructure and increased demand for residential properties are likely to attract investors looking for profitable investment."

The Delhi-Mumbai highway would improve Gurugram's connectivity even further and open up new investment opportunities. A quick and convenient connection between Delhi and Mumbai will be made possible by the project. This will increase demand for residential and commercial space in the surrounding areas and lead to the creation of more jobs.

Nearly 25 million sq ft mall space to be added in four to five years

Driven largely by rising consumption, the rebound in the Indian retail market has been exemplary in 2022, which is favourably impacting retail real estate across the country, finds a joint report by real estate consultants ANAROCK and Retailers Association of India (RAI). Buoyed by the growth, developers now plan to add nearly 25 million sq ft of new mall space across the top seven cities over the next four to five years, finds



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the report titled 'India Retail Real Estate: REvived, REshaped, and REinforced'.

NCR and Hyderabad account for nearly 46 per cent of the total new upcoming supply, closely followed by Bengaluru at 19 per cent. Back in 2022, the top seven cities added over 2.6 million sq ft of mall space, which was 27 per cent more than the preceding year (2021).

"The festive season, devoid of restrictions and any fear of the contagion, was exemplary with record high volumes and sales value," says **Anuj Kejriwal, CEO & Managing Director, ANAROCK Retail**. "Sales value estimated during the festive season in late 2022 was ₹2.5 trillion, nearly 2.5 times compared to the previous year. The revival of consumer sentiments and penchant for consumption is therefore being promptly acted upon by the majority of brands, retailers, and mall developers. The new planned mall supply across the top seven cities is testimony to the developers' expansion strategy."

Kumar Rajagopalan, CEO, Retailers Association of India (RAI), says, "The report highlights that the Indian retail sector attracted around \$1,473 million between 2019 and 2022, of which 76 per cent of total investments came in 2019 itself. Among the cities, Hyderabad and MMR accounted for nearly

40 per cent of the total private equity investments in the sector."

Presently, the top cities have over 51 million sq ft of mall stock across the country with NCR, MMR, and Bengaluru accounting for 62 per cent of the total stock. In terms of average rentals in malls, these appreciated by nearly 15 per cent in 2022 over the previous year, thus reaching higher than the pre-pandemic levels. Bengaluru registered the highest uptick in rentals of around 27 per cent, followed by Kolkata.

Cement demand to continue uptrend with 7-9% rise next fiscal

Buoyed by the infrastructure-focused Union Budget, the demand for cement is set for its third straight year of growth with a 7-9 per cent jump to 425 million tonne (mt) in fiscal 2024.

However, the outlook on operating margin, which has been under pressure, remains clouded with the prices of key inputs – coal and pet coke – remaining elevated. This will have a bearing on the credit risk profiles of players.

Says **Hetal Gandhi, Director-Research, CRISIL Market Intelligence and Analytics**, "Strong demand is likely to lead to incremental sales volume of 30-35 mt in fiscal 2024 after a cumulative rise of 68 mt over fiscal 2022 and 2023. This translates into a demand growth of 30 per cent since fiscal 2021, taking the total volume to 425 mt in fiscal 2024. Demand growth is likely to be starker in central and eastern regions, which account for over 80 per cent of PMAY-G construction."



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Cement demand grew 11 per cent on-year in the first 10 months of this fiscal, led by rapid execution in infrastructure projects and strong traction in the real estate and rural affordable housing segments. The momentum is likely to stay healthy in the remaining months of this fiscal as it is a seasonally strong period for construction activity across regions.

The next fiscal would again see the infrastructure and affordable rural housing segments propelling growth. The highest traction is expected from roads, where the total outlay for the Ministry of Road Transport and Highways and the National Highways Authority of India has risen 25 per cent and 14 per cent, respectively. The outlay for affordable rural housing has also grown 12.5 per cent in a pre-election year.

Railway to play a key role in developing the nation: MOS, Railways

The government is determined to reduce logistics costs from around 14 per cent of GDP to under 10 per cent while the National Rail Plan

targets an increase in the share of railways in freight transportation from 27 per cent to 45 per cent. Railways is the most economical and most accessible means of transportation compared to road, air or waterways, said **Darshana Jardosh, Minister of State for Railways and Textiles, Government of India**, at the National Conference on Freight by Rail organised by ASSOCHAM.

"Till now, the use of rail is more in carrying bulk goods, but today many goods which move by road can also be brought on rail, especially consumer goods which can be easily sent from one city to another through containers," said Jardosh. "Keeping this in mind, a target has been set to increase the share of railways in freight transportation from about 27 per cent to 45 per cent. To accomplish this, we need to track availability, wagon and rake, terminals and various freight schemes."

Anil Kumar Lahoti, Chairman & CEO, Ministry of Railways, said, "Over 1,200 projects have been identified to be completed in the next five years with a projected cost of ₹8.5 trillion including the addition of 9,000 km of the new line to the network, doubling and multi-tracking 25,000 km, automatic signalling on 10,000 km of track to increase capacity and speed of transport. Traction upgradation from 1 x 25 KV to 2 x 25 KV, increasing carrying capacity of freight trains and addition of more than 150,000 wagons and 7,000 locomotives to the fleet."

The budgetary outlay for railways has been increased to ₹2.41 trillion this year. The speed of commissioning additional track infrastructure has increased from 4 km per day to 11 km per day. Hundred terminals have been taken up under the Gati Shakti policy, and modernisation of existing terminals have been taken up with private participation and government funding.



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CURRENT AFFAIRS

Embassy REIT raises debt of ₹10 billion from Bajaj Housing Finance



Embassy Office Parks REIT has successfully raised a term loan of ₹10 billion from Bajaj Housing Finance. Embassy REIT will use the proceeds of this debt raise primarily to repay existing construction debt and for general corporate purposes.

Atul Jain, Managing Director, Bajaj Housing Finance, said, "We are delighted to partner with Embassy REIT, and hope to continue with this mutually beneficial partnership and look to strengthen the relationship further."

Vikaash Khdloya, CEO, Embassy REIT, said, "Amidst a rising interest rate environment, we are pleased to announce this debt raise of ₹10 billion from a marquee NBFC at industry-leading terms. With this refinance, our entire debt book is at fixed rates for an average of 18 months, demonstrating our active capital management to the benefit of our unit holders. Embassy REIT continues to be well-positioned to finance its growth, given its access to an expanding capital pool that includes banks, mutual funds, insurers, FPIs and now NBFCs."

The loan tenor of 12 years enables Embassy REIT to extend the maturity of its debt book. Post this debt

raise, 100 per cent of the debt book will be at fixed rates with an average maturity of 18 months. In effect, 65 per cent of the debt book will have fixed rates for two years on an average, and the balance 35 per cent for seven months.

Use of plastic waste mandatory in road construction

Plastic garbage must be used in the development and maintenance of service roads and national highways, according to the Central Government. As a result, the roads will be stronger, more resilient, and pothole-free. On February 6, the State and Federal entities responsible for road building received recommendations from the Ministry of Road Transport and Highways. The directive to use solid waste – plastic waste – in road construction was passed in January 2017. Under this, national roadways are constructed using 10 per cent of plastic garbage.

Highlighting the advantages of using plastic waste in roads, **Satish Pandey, Principal Scientist, CSIR-CRRI,** says, "Recent circular of MoRTH is a welcome initiative for waste utilisation. This initiative will ensure the utilisation of waste plastic in bituminous layers of the service roads and slip roads along with National Highways and will reduce various environmental concerns due to the accumulation of waste plastic in urban areas."

The development of several thousand kilometres of motorways in places like Delhi, Chennai, Pune, Jamshedpur, Indore, and Lucknow, has so far involved the utilisation of plastic waste.

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THE REALITY OF THE 'REALTY BOOM'

Against the backdrop of the global housing crisis and layoffs initiated by big tech, investors are trying to ascertain the state of the real-estate sector in India.

The real-estate sector is a key component in any thriving economy. The impact of real estate on the overall economy can be clearly understood when we take a look at any nation's growth story. Against the backdrop of the COVID-19 crisis, global economies took a hit. In the face of this disaster, the Indian real-estate sector remained largely resilient and bounced back once the pandemic was over. However, recent developments, including the global housing crisis and the layoffs by big tech, have got investors worried.





Global housing crisis vs. Indian real estate

China's rapid economic expansion was largely because of its housing boom. However, the property market, which accounts for about a quarter of China's GDP, is experiencing delayed growth. The IMF, too, has pointed out that China's real-estate crisis is not over yet. Consequently, it will have a significant impact on the country's economic growth. Likewise, a

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- The astuteness of Indian authorities in mitigating the COVID-19 crisis has the real-estate sector insulated from the global housing crisis.
- Inflation levels abroad shot up from 2 per cent to 9 per cent whereas in India, it touched 8 to 8.5 per cent.
- Current unemployment level in India is 7.14 per cent, as long as it does not creep up, the real estate growth story won't be impacted much.
- 92 per cent of recruiters have expressed optimism regarding hiring in the first half of the year 2023 after a turbulent layoff period.



"In the US and Europe, the governments doled out a huge quantum of

fiscal stimulus."

- Vivek Rathi, Director, Research, Knight Frank (India)



"For most existing home loan borrowers, the EMIs will not increase and the

higher rates will be adjusted by extending the tenure."

- Renu Sud Karnad, Managing Director, HDFC

number of reports from the West have painted a gloomy picture for the real-estate sector. As a result, real-estate investors in India are a worried lot. However, it is essential to understand that Indian real estate is not in a precarious situation so far, and much of this gloom and doom is related to how individual governments managed the COVID-19 crisis.

"In the US and Europe, the governments doled out a huge quantum of fiscal stimulus," says Vivek Rathi, Director, Research, Knight Frank (India). "In the US, it was as high as 10 to 12 per cent of the GDP. When it comes to India, even during those times, fiscal stimulus stood at about 1 per cent of GDP. Credit extended to creditworthy borrowers stood at 5 to 10 per cent; the NPA risk the government was willing to take stood at 2 to 5 per cent. So, when

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the effect of inflation came into play, inflation levels abroad shot up to 9 per cent from 2 per cent, whereas in India, it touched 8 to 8.5 per cent; this is something we have been exposed to in the past.

As a result, the interest rate hike abroad was phenomenal; from 0.25 per cent to 4.5-4.75 per cent. Home loan interest rates in the US were hiked from 2.5 per cent to 6 per cent. Moreover, the average loan tenure in the US is 30 years and there is no scope for extension, unlike India. In India, the average loan tenure is 10 years and an extension is given if interest rates are hiked."

Post COVID-19, even in India, interest rates on home loans were hiked but its impact on real estate is not expected to be as severe as witnessed in the global markets. **Renu Sud Karnad, Managing**

Director, HDFC, says, "A house purchase unlike other products is planned after a lot of due diligence within the family. If the property liked by the family is affordable in context of the income and the cost of the house, most people would go ahead and buy the house irrespective of interest rates. It is a single largest decision for any individual and has an emotional aspect attached to it. A genuine homebuyer who wants to buy a house to live will not hold back just because interest rates have risen. Even though the headline interest rates on home loans start from 8.45 per cent per annum onwards, the effective rates on home loans could be just above 5 per cent due to the fiscal benefits available on housing loans. I do not see the rate hike reducing demand for housing. For most existing home loan



The Indian real-estate sector remained largely resilient and bounced back once the pandemic was over.



"Domestic firms' share of leasing would also become a critical determinant of the overall office market performance in 2023."

- **Anshuman Magazine**, Chairman & CEO-India, South-East Asia, Middle East & Africa, CBRE



"The real estate sector will witness a growth of around 8-9 per cent; thankfully, no negative growth is indicated."

- **Prashant Thakur**, Sr. Director & Head - Research, ANAROCK Group

borrowers, the EMIs will not increase and the higher rates will be adjusted by extending the tenure wherever possible unless the customer wants to increase his EMI. Since home loans are long-term and interest rates will increase and reduce as well over this long tenure, the rates usually even out over the term of the loan. Only a fraction of cases may require readjustment of EMIs."

The big tech layoffs

To a certain degree, the astuteness of Indian authorities in mitigating the COVID-19 crisis has the real-estate sector insulated from the global housing crisis. However, the ongoing cycle of layoffs by big tech companies is posing another challenge for the real-estate sector. A good deal of commercial and



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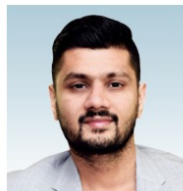
residential spaces in cities like Bengaluru, Pune, Hyderabad and Chennai cater to the IT sector. Having said that, according to a report 'Decoding Jobs 2023' prepared by Gurugram based digital recruitment platform Taggd in collaboration with CII: "The hiring in IT sector is expected to grow at a muted rate of 10 per cent. However, demand for tech talent will rise in conventionally non-tech industries like manufacturing, agriculture, and pharmaceuticals." So, is there a reason to worry?

"One of the major challenges will be handling the fallout from reduced income flows in the IT/ITES sector," says **Saket Mohta**, Managing Director, Merlin Group. "As it makes up a sizable chunk, we expect it to be a major challenge in cities like Pune and Bengaluru. However, this is not to say that the entire demand in the market will take a huge hit. The real-estate market will do well in 2023 as we can already see that the economy will be robust, local activity will resume and the government will take necessary measures."

"The Indian real-estate market has successfully cemented its position among the top 10 realty sectors in the world," asserts **Abhishek Kapoor**, CEO, Puravankara. "According to the India Brand Equity Foundation (IBEF), it is expected that the industry will reach a size of \$1 trillion by 2030 and will contribute 13 per cent of India's GDP by 2025. Last year, housing sales in India witnessed a record high of 3.65 lakh units across the top seven cities. Institutional investments in retail real estate also jumped to \$ 492 million in 2022. As part of the budget, there have been several large announcements,



About 92 per cent of recruiters and recruitment consultants in the IT sector have expressed optimism regarding hiring in the first half of the year 2023.



"The fallout from reduced income flows in the IT/ITES sector can be a major challenge in cities like Pune and Bengaluru."

- **Saket Mohta**, Managing Director, Merlin Group



"The domestic IT market has been resilient with layoffs confined mostly to a few startups."

- **Rakesh Reddy**, Director, Aparna Constructions and Estates

including the ₹790 billion allotment to PMAY. While internationally there have been layoffs in some companies, when viewed as a part of the whole IT/ITES sector, they are not significant in India. In 2021, we had a total of 4.5 million employees in these sectors, a

number which further grew last year. Over a period of time, the emergence of manufacturing, investments in infrastructure, government spending and increasing private investment cycle and economic activity will lead to a more stable job market and demand will continue to grow."

In agreement, **Rakesh Reddy**, Director, Aparna Constructions and Estates, adds, "Despite instances of global economic volatility, India's real-estate sector has continuously demonstrated its resilience. While it is unfortunate that the IT industry is facing financial headwinds leading to mass layoffs, this has so far been seen mostly in the developed markets. The domestic IT market has been resilient with layoffs confined mostly to a few startups. This will not have a significant impact on the real-estate sector in India."

Impact on real estate in Tier-II and -III cities

Another factor experts point out to is that though IT layoffs have begun, the unemployment rate in India stands at 7.14 per cent. As long as that does not creep up to

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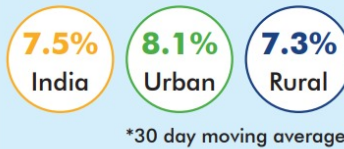
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the pandemic levels, the real estate growth story won't be impacted much. Having said that, a good deal of the IT workforce comes from Tier-II and Tier-III cities extending the impact of the layoffs on local real estate developers who do not match up to the capital inflows or reserves like well-known branded builders. On the bright side, Finance Minister Nirmala Sitharaman indicated the formation of Urban Infrastructure Development Fund (UIDF) in this year's budget. UIDF will be managed by the National Housing Bank and can be used by public agencies to create urban infrastructure in Tier-II and Tier-III cities. The government is expected to make available 100 billion Indian rupees (\$1.22 billion) for setting up UIDF.

"It is understandable to be concerned about the potential impact of tech layoffs on real-estate projects in Tier-II and -III cities, where a sizable portion of the IT workforce resides," observes Kaushal Agarwal, Chairman, The Guardians Real Estate Advisory. "A slowdown in the IT sector can lead to lower demand for housing, which can have a negative impact on the local real-estate market. However, it is important to remember that real-estate markets are influenced by a variety of factors and can vary greatly from one location to the next. While the situation in some areas may be difficult, it may not be necessary to 'run for cover'. Instead, it is best to carefully consider the specific market conditions and seek professional advice before making any major decisions. It is also worth noting that while the current situation is difficult, the real-estate market can be cyclical and there may be opportunities for recovery

Unemployment Rate as of Feb 22, 2023



Source: Centre for Monitoring Indian Economy

in the future."

Meanwhile, Reddy is quick to suggest that the prevailing circumstances may, in fact, give rise to opportunities for developers in Tier-II and -III cities. "The commercial real-estate sector in India has seen sustained growth due to an expanding workforce and decentralisation of commercial hubs, which are no longer limited to metros. Moreover, with the proliferation of remote working and the emergence of industrial corridors, there has been a shift in the geographical spread of commercial real estate towards Tier-II and -III cities."

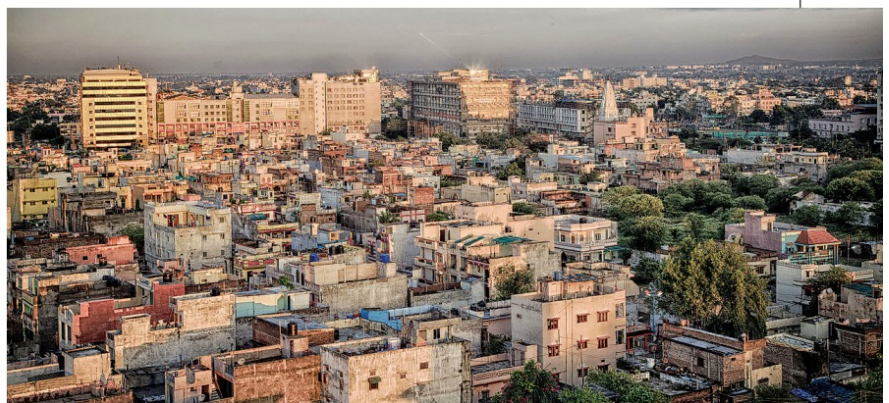
Ashok Chhajjer, Chairman & Managing Director, Arihant Superstructures, points out, "Tier-II cities like Indore are seeing all the

big IT companies setting up their bases. Human resources are cheaper and so is the cost of living in these types of cities. Hence, it is important to note that in Tier-II and Tier-III cities, challenges can also present opportunities for developers who are able to navigate them effectively. It is advisable to partner with local governments to secure funding for infrastructure improvements, and explore innovative building techniques to reduce the cost of construction."

The fear of 'muted' growth in the IT sector

Although the real-estate sector remains optimistic, NASSCOM has clearly indicated muted growth for the Indian IT sector in 2022-23. "India's IT services sector grew 2.1 per cent in 2020-21 and 15.5 per cent in 2021-22," according to a NASSCOM survey. "That scorching pace of growth likely moderated to 10 per cent in FY23 as a prolonged Russia-Ukraine war convulsed the global economy and China's COVID Zero policy disrupted supply chains."

"The muted growth will result in decreased hiring of freshers," says



Tier-II cities like Indore are seeing all the big IT companies setting up their bases.

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COVER STORY



“The rupee had ended 2022 at 82.74 per dollar, having depreciated 10 per cent

against the greenback, this too is fueling investments in India’s real estate sector.”

- Shashank Vashishtha, Executive Director, eXp India



“In 2021, we had 4.5 mn employees in the IT/ITeS sectors, a number which further grew last year.”

- Abhishek Kapoor, CEO, Puravankara

Prashant Thakur, Sr Director & Head-Research, ANAROCK Group. “However, as far as the real-estate market is concerned, freshers do not constitute the homebuyers’ market. So, the impact will not be a serious concern. The current average prices in the top seven cities are collectively about ₹6,150 per sq ft. If we look back, the last five years have seen an increase of over 11 per cent across the top seven cities (from ₹5,551 per sq ft in 2018 to about ₹6,150 per sq ft in 2022). The average property prices in the southern cities of Bengaluru and Hyderabad have increased by a maximum of 10 per cent annually over the past five years. In Bengaluru, the average price of a square foot of real estate was ₹4,894 in 2018 and reached ₹5,570 in 2022. In terms of

Average Property Prices Across Top Seven Cities in Last Five Years

City (₹ per sq ft)	2018	2019	2020	2021	2022
NCR	4,546	4,569	4,580	4,781	5,025
Kolkata	4,415	4,378	4,385	4,512	4,700
MMR	10,497	10,595	10,610	11,092	11,875
Pune	5,455	5,495	5,510	5,733	6,000
Hyderabad	4,128	4,185	4,195	4,372	4,620
Chennai	4,920	4,931	4,935	5,070	5,315
Bengaluru	4,894	4,961	4,975	5,217	5,570
Total Average	5,551	5,588	5,599	5,826	6,150

Source: ANAROCK Research

Hyderabad, the city’s average prices in 2018 were ₹4,128 per sq ft and reached ₹4,620 per sq ft in 2022.”

Thakur believes that the ongoing scenario of the IT sector will impact growth in real estate. “Growth in real estate is indicated but the intensity of growth will not be akin to post-pandemic levels. It will be around 8-9 per cent; thankfully, no negative growth is indicated.”

Likewise, going forward, the co-working industry will continue to gratify the need for quality spaces required by the young generation. According to a JLL report, “In India, it is expected to cross 50 million sq ft

by the end of the year 2023, which would be a YoY increase of 15 per cent. Managed Office spaces shall continue growing at 10 per cent in 2023.”

The FDI angle

Although real-estate markets will continue to witness traction, FDI inflows tend to be a problem when market sentiments are fluctuating. Learnings from previous recessions and slowdowns have indicated that China seems to have an upper hand in such circumstances over India. “China as a market has already matured and become



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Industrial & Logistics (I&L) Sector

The I&L sector leasing grew by 8 per cent Y-o-Y to touch 31.6 mn sq ft in 2022 despite global headwinds, and a slowdown in e-commerce demand and dissipation of the post-pandemic need to hold additional inventories. This is the second-highest leasing activity recorded in I&L sector after the 2019 peak of 32 mn sq ft.

Delhi-NCR led the absorption with 7.3 mn sq ft, followed by Mumbai and Bengaluru with 6.1 mn sq ft and 5.2 mn sq ft in 2022, respectively. The three cities accounted for almost 60 per cent of the leasing activity during the year.

Further, the leasing activity in 2023 is expected to remain range-bound, driven by sustained demand from 3PL, engineering and manufacturing and retail firms. On the supply front, we foresee project completions to exceed the 2022 levels and be in line with space take-up during 2023.

*Figure 1



Office Sector

The office sector in India witnessed gross absorption of 56.6 mn sq ft during 2022, registering a growth of 40 per cent (Y-o-Y), marking the second-highest leasing activity ever after it touched the peak in 2019 with 65 mn sq ft in 2022. As per the report, Bengaluru, Delhi-NCR, Hyderabad and Mumbai accounted for nearly 75 per cent of the yearly leasing activity. With the relaxation of COVID-19 restrictions, the release of pent-up demand, and a gradual acceleration of return-to-office (RTO) plans by occupiers propelled leasing momentum.

In line with the trends witnessed in the past, a strong supply pipeline and continued occupier interest in investment-grade buildings by leading developers and institutional owners in core locations is likely to lead to an increase in development completions in 2023.

With a few challenges emerging across developed economies, the full impact of these risks on global corporates' leasing decisions is yet undetermined. Amidst this, as India remains an attractive, cost-effective destination with a skilled talent pool, firms will look up to the country to optimise their operations and absorption levels could still normalise to levels lower than the peak witnessed in 2022. In line with the trends witnessed in 2022, domestic firms' share of leasing would also become a critical determinant of the overall office market performance in 2023.

*Figure 2

stagnant in terms of investment returns whereas India is currently buzzing and shows great potential for growth," says **Saurabh Vohara, Founder & CEO, ALYF**. "There is definitely a shift in the industrial movement and the focus is on India. The year 2021-22 saw the

highest ever FDI of \$ 84.80 billion. So, there is definitely no uncertainty for FDIs and investors regarding the Indian markets."

"With FDI exceeding \$50 billion for the last three consecutive years, India is still one of the world's most popular FDI destinations," avers

Reddy. "The real-estate landscape in India has transformed into a global juggernaut amid policy reforms, institutional investments, foreign partnerships and growth in the services sector. The introduction of Real-Estate Investment Trusts (REITs) in India is expected to further attract foreign investments. REITs open the market to the public instead of restricting participation to institutional investors. They are expected to reduce the financial deficit in the real-estate sector and encourage more commercial development due to better pricing and growth opportunities. Foreign investors look favourably to the commercial segment owing to higher returns and better capital appreciation."

Depreciating rupee and NRI investments in real estate

Commenting on the increasing investments done by NRIs in Indian real estate, **Shashank Vashishtha, Executive Director, eXp Global India**, says, "NRI investment in Indian real estate increased by more than \$13.4 billion (6.4 per cent) in FY21 compared to FY20, despite the pandemic and its aftermath. The rupee had ended in 2022 at 82.74 per dollar, having depreciated 10 per cent against the greenback, and this too is fuelling investments in the Indian real estate sector. Another significant factor is that the budget for 2022 and 2023 included highly favourable incentives for NRI investment. The maximum surcharge on both short-term and long-term capital gains, for instance, has been reduced from 37 per cent to 15 per cent."

According to India Sotheby's International Realty, prices of luxury properties appreciated by 8-12 per cent during the last year across major cities and has

breached the 2015 peak level. NRIs are aware of this trend and consider the Indian real estate sector to be a safe investment. In the coming years, it is anticipated that the luxury real estate market will expand even more. Last month itself, 28 flats in Oberoi Realty's Mumbai luxury project sold for ₹123,80 million. "The investors have witnessed a price rise of 15-20 per cent in 2021-22," says Vashishtha, "Even if we take an average across six years, the investors are still getting a return of 6 per cent."

Shashank adds that in the affordable segment, people are withholding their purchases since the interest rates shot up from 6.5 per cent to 8.5 per cent leading to a dip in demand. "Having said that, even in the affordable segment, there is significant traction in the 'ready to move-in' apartments. In this segment as such, people are paying ₹15,000-20,000 as rent, and if they take a loan for ₹30 lakh, they end up paying a similar EMI, so this sounds like a safer bet."

In conclusion

As long as the domestic market continues to perform well and the rate of unemployment remains in control, the real-estate crisis can be averted. The global housing crisis too will also not play spoilsport.

Moreover, according to a report published by job portal Naukri.com, 92 per cent of recruiters and recruitment consultants have expressed optimism regarding hiring in the first half of the year 2023 after a turbulent layoff period. Out of 1,400 consultants and recruiters from over 10 major industries who were surveyed, only 4 per cent of recruiters predicted that layoffs and downsizing would be their company's strategy in the first half of 2023. IT is now expected to be the functional area where



Retail Sector

According to the report, retail leasing grew by 21 per cent Y-o-Y in 2022 to 4.7 mn sq ft in 2022. Supply in 2022 stood at 1.4 mn sq ft. Overall, Bengaluru and Delhi-NCR had a major share (61 per cent) in leasing activity in 2022, while Chennai, Hyderabad, and Pune had a 9 per cent share each.

Even though a challenging scenario across developed economies, retail leasing activity scaled a new high in 2022. Given the robust supply pipeline planned for 2023 and strong domestic consumption, leasing activity is anticipated to remain steady. We also expect more international brands, especially in the F&B space, to enter the country. Going forward, we expect retail leasing to gain traction in Tier-II, -III, and even -IV cities as retailers and landlords are looking to leverage the purchasing power of these towns and cities. Activity in these cities will remain strong from domestic retailers, with international retailers expected to be more active in the apparel and QSR segments.

Although inflation might weigh on the Indian economy going forward, the rebound in brick-and-mortar retail sales this past year is expected to continue in 2023. Brands would continue to resize and recalibrate their physical store strategies to diversify their portfolio and expand footprint, with 'experience' becoming an important frontier to bridge the retailer-consumer gap.

*Figure 3



Residential Sector

Last year ended on a strong note with sales climbing to an all-time high and unit launches touching a decadal high. About 295,000 units were sold in 2022, a 46 per cent Y-o-Y growth in sales in 2022. A 50 per cent Y-o-Y rise in unit launches in 2022 was witnessed, 71 per cent > Combined share of Mumbai, Hyderabad and Pune in unit launches in 2022. 62 per cent cumulative share of Pune, Mumbai and Delhi-NCR in sales in 2022.

Positive homebuyer sentiments are being witnessed in the residential sector, fueling housing sales and new product launches; nevertheless, a delayed effect of the continued monetary tightening on sales might be a major issue.

Outlook for homebuyer sentiment is predicted to remain positive as we near the end of RBI's monetary tightening cycle, taking receding inflation into account. The prospect of a slowing sales momentum might cause a gradual and selective increase in capital value. Mid-range and budget sectors will continue to account for the lion's share of sales, although unsold inventory levels are likely to decline in the near future and gain traction. Healthy momentum is expected to continue in the high-end and premium segment, with several projects slated to launch in the coming quarters.

Certain pockets with low unsold inventory levels would continue to see appreciation in capital values backed by steady demand. Apartment units in the 1,200-1,500 sq ft range would continue to witness higher traction. Strong momentum in land acquisition is also likely to continue.

*Figure 4

*Figure 1, 2, 3, 4 - As pointed out by Anshuman Magazine, Chairman & CEO - India, South-East Asia, Middle East & Africa, CBRE

hiring changes will have the maximum impact.

All considered, the real-estate sector in India this year may

not boom but it will continue to bloom at 8-9 per cent, a rate that is slower than the post COVID-19 scenario.

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20 Years of Window Excellence

The celebrated architect Le Corbusier once stated that the history of architecture was also the history of window. From being a humble hole on the wall to act as the 'light-bearer' and ventilator to being a complex, modern structure combining multiple functionalities and beauty, the simple window has come a long way. Unfortunately, even two decades back, India was indifferent to the differences a window can make to our homes and to our lives.

Earlier homeowners in India would spend money and time on tiles, flooring, kitchen cupboards, wallpapers and even washrooms along with many other areas. Windows took a backseat. They were often made of wood and were prone to termites, weather conditions and fading over time. The windows and doors were all handmade and no carpenter could guarantee the quality and performance of the end product. Plus, the changing temperatures and vagaries of weather could cause chinks in the window and door frames. Windows and doors would shrink during monsoon, gradually fade and lose their sheen. The iron windows present in the market were of inferior quality. The market being primarily unorganised and with negligible standard quality checks in place, the brand Fenesta disrupted the market and gave the superior choice which consumers deserve.

Expertise Beyond Expectations

It was back in 1889 when DCM Shriram Ltd., a family owned-business, started its eventful journey. Today, a global conglomerate, the organisation has imprinted its presence in Agri-Rural, Chloro-Vinyl and Value-Added Businesses. Fenesta, an initiative of the ₹ 9849 crore-worth DCM Shriram Ltd., came into being in 2003 as the pioneer in ready-to-install uPVC windows and doors in India. With its superior knowledge about the needs of the Indian homes and its innovative solutions, the brand has changed people's perceptions of the functions and role of windows and doors. The excellent products from India's No. 1 Windows and Doors Brand have brought about an unparalleled makeover in people's lifestyles and bettered the health and wellness of millions of Indians.

uPVC – Pioneering Healthy Living

With its profound knowledge of Indian weather conditions and local requirements, Fenesta introduced the game changing uPVC windows and doors in the Indian market. Instead of blindly imitating the products available in the European market, it focused on the local climatic conditions (tropical heat, UV rays, coastal winds, humidity, rain) and the daily nuisances like dust, noise and pollution. Thus, the ready-to-install Fenesta uPVC window - the amalgamation of high-end technology, 21st-century excellence and localisation – was born.

The frames of uPVC windows are reinforced and curated using Fenesta's proprietary uPVC formulation, comprising of special additives, making them more durable and a high-quality fenestration solution. The windows not only braved the extreme weather conditions but also shut out the dust and noise – offering healthy living spaces. Architects, builders, homeowners couldn't ignore the many improvements brought about by those game-changing products.

The uPVC products of Fenesta retain their colour, lustre and most importantly, their shape for long. With negligible thermal expansion and contraction and extremely low thermal conductivity, they are known for their superior performance, excellent energy efficiency and eco-friendliness. Now that India's capital, cities and towns are on the global lists of world's most polluted places, uPVC window powered by advance insulation properties is the need of the hour.

Aluminium – Eco-friendliness to Epitome of Luxury

After the huge success of uPVC products, to uplift the quality of fenestration solutions, Fenesta ventured into Aluminium windows and



Aluminium Luxury Slider Window

doors. Being tensile, malleable and 100% recyclable, reducing deforestation and global warming. Acting as an efficient protector from heat, Fenesta's aluminium products like their uPVC counterparts protect the inhabitants from any vagaries of weather, significantly insulating against harmful elements like pollution, noise and dust and hence, adding value to their lives.

Fenesta's aluminium offerings also make living spaces luxurious with minimalistic and contemporary designs.

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These doors are available in an array of rich colours and alluring textures.



Solid Panel Doors

The Milestone of 4 Million Installations

Being the only Brand in the category to reach a milestone of 4 million plus installations, over the years, Fenesta has not only brought inimitable products but has also expanded its infrastructure. Some of the highlights are 365-day customer care support, covid-compliant services across 350+ cities and international markets, 7 modern manufacturing units, 250+ partner showrooms and 9 signature studios.



Technology at its core

Exploration of wide portfolio of products from the comfort of one's home is made possible with the user-friendly Fenesta app. First introduced during the pandemic, the AR enabled app allows one to visualise how the windows and doors will appear once installed in a room and one can experience the VR walkthrough of the studio to get a feel of the showroom and its wide range of products, without the traffic hassles of travel and from any location. Fenesta is also set to bring in the automation to all Fenesta homes with its sensor based app supported product systems that apart from being a safety feature, will also improve the experience of the consumer. Fenesta keeps technology at its core and keeps on evolving its IT infrastructure to ensure world class customer service!

Completing 20 Years of Window Excellence, Fenesta couldn't thank its patrons enough for their continuous support. The last two decades witnessed the brand's vision, its many design & service excellence and multiple accolades.

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CIVIC SENSE

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“Davanagere smart city has completed six major smart roads at ₹461.5 million.”

- Veereshakumar, IAS, Managing Director & CEO, Davanagere Smart City

Popularly known earlier as the ‘Manchester of Karnataka’, Davanagere is part of the Phase 1 cities of the Smart City Mission. With achievements such as the Award of Excellence in Urban Transport and the Vivekananda Sustainability Award under its belt, the smart city SPV has been implementing ICT-related initiatives to make the citizens of the entire city feel inclusive. Veereshakumar, IAS, Managing Director & CEO, Davanagere Smart City (DSCL), shares more in conversation with SNEHA IYER.

Davanagere Smart City recently bagged the ‘Award of Excellence in Urban Transport’ from the Ministry of Housing and Urban Affairs. Tell us about the initiatives



Veereshakumar,
IAS, Managing Director & CEO,
Davanagere Smart City

taken by the city that contributed to this success.

We won the award for the successful implementation and monitoring of traffic junctions through CCTV cameras and generating

e-challans by the police department. Public messages are announced through 40 PAS to achieve lane discipline in traffic junctions. Through this, we have been able to reduce accident rates drastically. By using CCTV footage and nine video analytics features, authorities are solving several cases within a matter of hours. We have been able to make the city safer and reduce mortality rates. We have also installed digital display boards and VaMS boards to display precautionary messages about traffic and crime violations from the police.

The city has set a precedent for urban infrastructure. Please elaborate on the efforts taken towards infrastructure in the areas



of surveillance systems, traffic analytics, e-governance and solid waste management.

Most of the city is covered by surveillance cameras. There are 213 cameras, which are a combination of PTZ (pan-tilt-zoom) and fixed cameras at 109 locations. These cameras are monitored exclusively by the police department at a dedicated police command-and-control centre.

City entry and exit locations are covered under the ANPR (Automatic Number Plate Recognition) cameras, which assist the police department in keeping a close eye on the vehicles entering the city. They automatically capture speeding and red-light violations, along with the violation time, date, location and image of the license plate that is auto-pushed for challans. The ATCS (Adaptive Traffic Control System) has allowed us to adapt to real-time information of traffic density and automatically change the traffic cycle time.

On the waste management front, all solid waste management vehicles are monitored through an ITS application by the corporation staff at the ICCC (Integrated Command-and-Control Centre) for distance covered,

trip completion, footprint of the vehicle, and more. Owing to this, we have been able to address any sanitation issues efficiently and redirect vehicles to the needed areas.

Also, please highlight upcoming projects along with their cost.

Davanagere Smart City has moved into Phase 2 of the ICT project, which is an extension to the completed ICCC. This project will have unmanned aerial vehicle surveillance of the city at fixed time slots. The path would be such that the entire city is covered. Additionally, drones will have an auto recharge function and seamless captured data transfer when at its base station. We have partnered with Tera Soft, an IT and ITeS company from Hyderabad, for this project. The cost of the project is ₹61.8 million, inclusive of OPEX.

The city has been working towards redeveloping and modernising its bus stations, heritage areas and creating smart roads. Where do we stand on the progress?

The SPV has undertaken a smart bus shelter and modernised the

existing one. The bus stands are connected and monitored through the ICCC, which allows passengers to receive updated bus timings for arrival and departure. We have executed the project in a PPP model and completed it in two phases at a cost of ₹80.3 million. In all, we have built 104 bus stations with a five-year maintenance period.

“

To reduce energy and operational costs while delivering reliable, safe and efficient services, we have installed solar rooftops on eight government buildings.

”

We have also revived Kalyani, a central area in the ABD, as a picnic area for all. Further, the Clock Tower of the city has been modernised at ₹31.4 million while still maintaining the old infra and heritage aesthetics.



Kalyani, a central area in the ABD, has been revived as a picnic area and has received various acclamations.

CIVIC SENSE

The Kalyani project has received various acclamations. The RV College of Architecture in Bengaluru is currently doing a study on the area.

So far, Davanagere smart city has completed six major smart roads, awarded at ₹461.5 million and completed 2,860 m of roads with a plan to develop infrastructure of 3,180 m.

Davanagere has also been placing an emphasis on sustainable development. Please share the progress.

Davanagere Smart City has strived to improve city services and urban management of residents. And sustainability has been a key area for us. Under the quality education goals, the city has undertaken a smart education project to develop 53 smart schools in three phases at ₹100 million. It is a small step in the education sector that could be a giant step for government school children. As per the climate action goals, we have planted over 11,000 saplings for afforestation projects in Davanagere. To reduce energy and operational costs while delivering reliable, safe and efficient services,



The smart city has completed 2,860 m of roads with a plan to develop infrastructure of 3,180 m.

we have installed solar rooftops on eight government buildings. In fostering resilient and sustainable development, we have been able to achieve our goals through developing major and secondary stormwater drains in the city. A total of 69 km of drain network has been developed at ₹1.2 billion. This project has also been a personal favourite. For this achievement, we received the Vivekananda

Sustainability Award in 2022.

Tell us about the projects being undertaken for sanitation and hygiene. Any infrastructure projects and related procurement activities in the pipeline for this?

DSCIL has installed napkin vending machines and incineration units at 40 locations in women's college and hostels. Additionally, to make up for the gap of non-operating traditional units, we constructed 29 e-toilets across the city. The project had a total cost of ₹34 million with five years' maintenance. It has been well received by the elderly community. Since the initiative, we have seen the usage of toilets increasing.

What is the total smart city budget for the city, and where is it being sourced from?

The smart city budget has been allocated through the MoHUA under CSS (Central Sponsored Scheme). The SPV has been incorporated under the Companies Act and has a budget of ₹10 billion. This is split 50:50 between the Government of India and Karnataka. | CW |



The Clock Tower of the city has been modernised at ₹31.4 million while still maintaining the old infra and heritage aesthetics.

To share your city's development plans, write in at feedback@constructionworld.in

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How Does Automation Help Handle Materials?

CW explores how automation kits can bring productivity gains to material handling, besides ensuring safer operations.

While automation can deliver tangible productivity gains to every industry, it can especially improve safety in the hazardous construction and mining industries.

Consider automation as applied to material-handling equipment used in construction and mining, from cranes to conveyors. The math in favour of models with automation features is simple. Say, if the filling of a bucket of an earthmover were left to the judgement of the operator, sometimes it would be underfilled and sometimes overfilled, potentially to great loss either way. A suboptimal fill, even a 90 per cent fill, would shave 10 per cent off the optimal productivity level. Whereas, a 110 per cent overfill could damage the

machine or even cause it to topple.

If you bring in automation, “a load indicator and cut-out automation kit that eliminate the need to rely on the operator’s judgement could ensure consistently productive operations,” points out **Rakesh Kumar, Managing Partner, Sara Infrasolutions.**

Not to mention a safer site that sees fewer breakdowns and incurs lower maintenance costs.

“As a rule of thumb, the greater the level of automation, the safer the workplace for the operator and others, and the higher the confidence levels of the team,” he continues. “Automated machines fail less frequently than manual machines and hence reduce maintenance cost and contribute

to uninterrupted operations.

The higher the level of automation, the less the manual intervention and the higher the likelihood of the machine enjoying a longer life.”

What’s on offer?

Automation for popular material-handling vehicles, such as mobile cranes, tower cranes, aerial working platforms, scissor lifts and tele handlers, include sensor-based solutions that can automate the machine’s stability, motion and fluid handling for better safety and higher performance.

“Motion-control sensors reliably measure rotational speed, position and acceleration while process sensors can measure the levels, temperature and pressure of fluids,”



QUICK BYTES

- In bulk material-handling belt conveyors, automation is associated with safety solutions.
- Sensor-based solutions can automate stability, motion and fluid handling.
- To push acceptance for automation, the OEM and kit supplier should bring down the cost.

explains Priyadarshan Bawankar, Product Marketing Manager, Heavy Industries, Baumer India. "Load-measuring sensors fitted to buckets or trailers can further help automate operations and the load cycle in particular."

Baumer India's sensor-based solutions can help to accurately position and steer the machine by providing precise distance measurements, object detection, angle and inclination measurements. Baumer India provides solutions both to users for retrofits as well as directly supplies to OEMs.

The most popular automation kit for a crane is the safe load indicator with hydraulic shutoff, according to

Siddhartha Rao, Managing Partner, Vertex Infracore Solutions. Mobile cranes fitted with a safe load indicator cut off the hydraulics if the operator attempts to lift or handle loads beyond the crane's peak load capacity at a particular lifting angle, thus preventing untoward accidents.

"Another popular automation kit for tower cranes is the anti-collision system, which prevents collision with nearby structures, buildings, trees and other tower cranes working in the vicinity, even two adjacent cranes in the same bay running on the same rails," he adds.

Safe conveyors

Bulk material-handling systems that continuously transport and supply bulk materials are mainly used by the cement, metal and steel, and mining industries, and by power generation plants. One of the most prevalent equipment types of bulk material-handling systems is a belt conveyor, which is more popular than screw, chain and pneumatic conveyors. Conveyors can be made safe by physical guarding (mechanical protection), and fail-safe control systems.

"Fail-safe control systems of conveyors ensure that a single fault will not lead to the loss of the safety



"Integrating load sensors fitted on dumpers and haulers with weighbridges eliminates

human errors in tracking material load/production."

- Satish Penmetsa, CEO, GroundHog



"Retrofit kits reduce owners' total cost of ownership anywhere between

10-15 per cent."

- Piyush Singh, Manager-OE Sales & Marketing, Komatsu

function in case of device failure," explains Ramji Singh, Vice President-Sales, Schmersal India. "Monitoring controls must be in line with requirements provided in EN ISO 13849-1, a safety standard specifying guidelines for the design of the safety parts of the control system."



Komatsu's wheel loaders come with advanced retrofit kits such as a 360° camera system, a payload monitoring system and more.

Photo Courtesy: Komatsu

FEATURE-MATERIAL HANDLING EQUIPMENT

The Cost of Automation

It isn't easy to quantify the cost of automation; it depends on the type and level based on the operating conditions, according to **Rakesh Kumar, Managing Partner, Sara Infracore Solutions**. But, in general, he reckons that the cost increases by 10-20 per cent for automation features that make a substantial difference to the working environment, such as load, height (lift) and tilt angle cut-outs, and more.

"Depending on the capacity and tonnage of the crane, the safe load indicator system for mobile cranes costs approximately 4-5 per cent of the machine cost," says **Siddhartha Rao, Managing Partner, Vertex Infracore Solutions**. "It can be retrofitted as well as ordered from the OEM. Depending on the capacity and tonnage of the crane, the anti-collision device for tower cranes costs approximately 7-10 per cent of the equipment cost. This, too, can be retrofitted or ordered from the OEM."

All these features are add-ons. In general, Kumar points out, "The best-selling models of material-handling equipment, like telehandlers, backhoe loaders and pick-n-carry cranes available in India, are mostly devoid of automation to keep the price low. Whereas the overseas models of those machines fully loaded with automation features can cost twice as much. Although some global leaders in this segment have started to introduce basic automation options in their locally manufactured products, this is still at a low level when compared to models sold globally."

"Retrofit kits are not priced significantly in comparison to the equipment cost but the value they add to equipment operation and maintenance, reducing total cost of ownership, is anywhere between 10 and 15 per cent," adds **Piyush Singh, Manager-OE Sales & Marketing, Komatsu**, speaking of retrofits for Komatsu's wheel loaders and electric rope shovels.

In bulk material-handling belt conveyors, automation is associated with safety solutions. "The deployment of safety automation solutions is based on a risk assessment, and includes safety pull cord switches (from 10 m to 200 m), belt sway switches, heavy-duty limit switches, including safety addressing systems like the Dupline system and online belt monitoring system from Roxon," he explains. "Under tec.nicum, Schmersal supports the industry with man and machine safety expertise services and solutions, including academic services, consulting services, engineering, integration and validation."

Pull cord switches help stop the

conveyor belt in the case of any emergency and belt sway switches installed on both sides of a conveyor to monitor the extent of flap in the belt; these sound an alarm if the belt flaps beyond certain limits. Safety addressing systems signal the control room to convey the health of the switches as well as to track exact faults to reduce downtime and ensure faster maintenance. Online belt monitoring is installed for each conveyor to monitor aspects denoting the health of the belt, like steel chord thickness, RIP and splice control, to take on-time corrective action to eliminate safety hazards and downtime. "Such safety systems and switches are being used by the



"Revised government norms in favour of automation and their strict

implementation would help push adoption."

- **Rakesh Kumar, Managing Partner, Sara Infracore Solutions**



"The most popular automation kit for a crane is the safe load indicator

with hydraulic shutoff."

- **Siddhartha Rao, Managing Partner, Vertex Infracore Solutions**

cement, metal and steel, and mining industries, and power generation plants to increase their productivity and make their entire operations safe," adds Singh.

Automation in mining

Komatsu's wheel loaders and electric rope shovels come with highly advanced retrofit kits such as a 360° camera system, a payload monitoring system and the ability to integrate with a fleet management system to generate real-time operational data, helping to take live informed decisions, shares **Piyush Singh, Manager-OE Sales & Marketing, Komatsu**. "Coal India is a major buyer, and among private mine owner-operators, Reliance Sasan and Tata Steel buy our equipment retrofit kits to enhance component life and reduce operational expenses. We integrate retrofit kits at our cost because it helps us drive our inventory

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FEATURE-MATERIAL HANDLING EQUIPMENT

“Fail-safe control systems of conveyors ensure that a single fault will not lead to the loss of the safety function in case of device failure.”

- **Ramji Singh**, Vice President-Sales, Schmersal India

“Motion control sensors reliably measure the rotational speed, position and acceleration.”

- **Priyadarshan Bawankar**, Product Marketing Manager, Heavy Industries, Baumer India

planning and preventive maintenance strategy, avoid premature failures, enhance the life of components and, in turn, optimise operations.”

For mining companies looking for easy-to-use software solutions, GroundHog’s offering to digitise and automate mines integrates various sensors fitted on material-handling equipment to automate data collection and enable visualisation of the data in real-time, shares **Satish Penmetsa**, CEO, GroundHog.

Capturing real-time data offers multiple advantages. For instance, “integrating load sensors fitted on dumpers and haulers with weighbridges eliminates human errors in tracking material load/production, increases real-time data visibility for all stakeholders and helps make better operational decisions, better forecasts and ultimately increase revenue,” he points out.

“Data from fuel sensors helps optimise fuel consumption, which directly contributes to the organisation’s ESG goals,” adds Penmetsa. “Telematics systems that generate detailed engine statistics help pre-empt downs and thus



Photo Courtesy: Vertex Infracore Solutions

Mobile cranes fitted with a safe load indicator cut off the hydraulics if the operator attempts to lift loads beyond the crane’s peak load capacity.

increase the availability, utilisation and lifetime of material-handling fleets. A step further, combining such integration with autonomous vehicles enables full autonomy.”

Fully autonomous material-handling equipment is a long time away. So far, GroundHog is implementing weighbridge integration in an Indian mine. And, as Singh points out, “Complete autonomous features are available for haul trucks but the infrastructure in Indian mines is not at a level where those features can be deployed.”

Towards greater adoption

By and large, in India, “the prevailing mindset is to rely on the eye to measure distances within vision or on a less expensive (and less precise) cheaper gauge,” says Bawankar. “But this compromises precision and, through that, safety and productivity.”

So not surprisingly, thus far, the most uptake of Baumer India’s automation solutions has been for the production of steel and earthmoving machines deployed in metal mining where safety is

paramount and the availability of skilled operators is limited.

Cost consciousness has so far stood in the way of India adopting automation on a large scale, opines Kumar. So, he says, “to push acceptance for automation, the OEM and kit supplier should try to bring down the cost of the technology. Also, OEMs must address operator concerns about the loss of employment and educate fleet owners about the gains from automation.”

In fact, Rao believes the lack of skilled manpower to operate or supervise sophisticated automated equipment is another major impediment to adoption.

Revised government norms in favour of automation and their strict implementation would help push adoption, adds Kumar. “One way to do this is to amend the conditions of contracts tendered by the government.”

If all these pointers were to be acted on, takers for automated material-handling solutions would surely increase.

- CHARU BAHRI | CW |

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The Decarbonisation Challenge

Steel veterans gather at FCC's 'Make in Steel' conference in New Delhi.

In 2018, it was estimated that each tonne of steel produced emitted an average of 1.85 tonne of carbon dioxide, equating to about 8 per cent of global carbon dioxide emissions. Today, steel players across the globe along with their Indian counterparts are

increasingly facing the decarbonisation challenge.

Conference highlights

Able organised by FIRST Construction Council (FCC) in association with CONSTRUCTION WORLD and Infrastructure Today

magazines, the sixth edition of the MAKE IN STEEL Conference & Awards 2023 was held on February 10, 2023, in New Delhi with the theme 'Decarbonisation v/s Growth'. The dynamic participants, including steel specialists from across the country, discussed the





Terrence Busuttil
Director,
ConstructSteel, World
Steel Association



Prabodha Acharya
Chief Sustainability
Officer, JSW Steel



Dr Mukesh Kumar
Sr Advisor,
JSP Group



RK Vijayavergia
Consultant,
SRTMI



Deepak Vaidya
Business Head,
Outokumpu



Rajiv Nehru
In market Lead
Asiapac, RICS



Shailesh Bhandari
Managing Director,
Electrotherm India



Shashank Rajbhoj
DGM - Design,
Afcons Infrastructure



Sanjiv Garg
Managing Director,
Pipavav Railway
Corporation



AK Verma
GM - Design, Rail
Land Development
Authority



Pankaj Gupta
Founder & CEO,
ROARK Consulting
Engineers

use and quality of steel in Indian conditions.

Terrence Busuttil, Director, ConstructSteel, World Steel Association (WorldSteel), shared a global perspective of steel with the audience. In his keynote remarks, he said, "We expect the steel construction industry to grow by around 2 per cent as the rate of urbanisation growth and the growing rate of domestic products around the world are generating an increase in construction. The additional factor post-COVID is related to the energy transition, as we move away from fossil fuel to renewable energy sources used for construction. When we look at buildings driven by urbanisation and population, infrastructure is

further developed, and this is a mega trend that we see in construction today. This allows the steel industry to position itself in a market that is growing over time. However, the share of the steel market in construction is not high. We escalate it at about 25 per cent and it is low in general across all markets."

Further, he added, "We need to treat the construction industry as segments, and then target those segments. Bridges, low-rise residential buildings, and high-rise residential buildings, etc, are all different segments in the realm of construction, but they cannot be treated in the same way from a market development perspective. They must be treated differently,

using different tools to increase their market share."

Prabodha Acharya, Chief Sustainability Officer, JSW Steel, was highly vocal while offering an Indian perspective on emissions, stating, "According to the Government of India, for primary steel production, last year the average reading of emission level was 2.55 tonne of carbon dioxide per tonne of crude steel. That amounts to almost 300 million tonne of carbon emissions last year in India. Even if we reduce the emission intensity by 20 per cent by 2030, our CO2 emission will still be 500 million tonne. And when we reach 2050 at the same pace, the emission figure is going to be too high."

EVENT REPORT



Recognising Excellence: All the 'Make In Steel 2023' awards recipients from various categories make a picture-perfect moment. Seen in the picture (L-R): Amit Vikram (second) from Sunvik Steels; Vikram Gupta from JSW Ispat Special Products; Dr Sanak Mishra; SK Pradhan from Jindal Steel; Sachindrakumar Singh from Tata Steel; Kalyan Kumar from Jindal Steel; & Arindam Banerjee from Shyam Steel.



Huge feat: Naveen Jindal, Chairman, Jindal Steel & Power, was recognised with 'Entrepreneur of the Year' award.



Triumphant moment: Dilip Oommen, CEO, ArcelorMittal Nippon Steel India, poses with his 'Man of the Year' award.

He opined, "By 2050, it is improbable to achieve net-zero targets. With the currently known technology and the advent of expected technologies, we will still be dealing with emissions of around 25 million tonne even by 2070." He further asserted, "Manmade emissions need to be equal to manmade removals of emission to achieve net zero. We have to either opt for nature-based solutions like planting additional trees or implement technology-based solutions like carbon capture and storage. But, as of now, we don't know when that is going to be implemented."

He went on to add, "For planting more trees, there will be a requirement of almost 2.5 per cent of forest land for the steel sector to achieve net zero. We will need 2 million hectare of land for tree plantation. But even with these challenges on our hands, we

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cannot afford to stop the growth of the sector."

Giving his expert advice on the decarbonisation v/s growth theme, **Dr Mukesh Kumar, Sr Advisor, JSP Group**, said, "It has to be seen on an apple-to-apple basis as we are comparing Europe with India. In India, regeneration has not started as yet. Our scrap aggregate is only around 22-24 million tonne whereas the world market is huge. All international players are heading towards decarbonisation by using renewable power generation."

Sharing his experience of working with the ministry for the past five years, he stated, "By 2047, steel demand will be around 500 million tonne but steel scrap availability will never go beyond 120 million tonne. I feel all the ministries like steel, MNRE, external affairs and finance need to ensure that the interests of the Indian steel industry are not damaged but protected."

On the back of his vast experience, **RK Vijayavergia, Consultant, SRTMI & Ex-Executive Director (Operations), SAIL**, observed, "To head in the right direction towards achieving net zero, first, we need technology to avoid emission and, second, to manage emission in such a way that we prevent it from entering the atmosphere. In particular, technologically derived electric arc furnaces can be used as the most sustainable option. But going for 100 per cent electric arc furnace is normally unrealistic."

With regard to the challenges, he said, "We have our plants in operation for several years. As new green technologies are available, within the plant, we will have units that will be producing green steel. There may be difficulty in identifying green steel within the combined setup of conventional mills and the new green technology producing



Unveiling Report: FCC's comprehensive research and analysis 'TMT Rebar Report 2023' was made public by **Tanveer Padode, Business Head - Digital, ASAPP Info Global Group**; **Sanjiv Garg**; & **RK Vijayavergia**.

steel. If we adopt hydrogen-based technology in the future, we have to prepare ourselves now. And to run these plants, we need new-age skills in hydrogen generation, transportation, storage and reduction."

Speaking on the sustainability of steel, **Deepak Vaidya, Business Head, Outokumpu**, appealed to the audience: "It is not only about the technology used for producing steel that is going to help us. Working on sustainability is the moral responsibility of all stakeholders involved. In India, we should also consider small-scale hydro plants to produce electricity used for producing steel."

Touching upon the ideal choice of material in construction, **Shailesh Bhandari, Managing Director, Electrotherm India**, stated, "The total cost of the project will not go up by more than 1-2 per cent if epoxy-coated bars are used. The government has made it mandatory in all coastal areas in Gujarat to use epoxy-coated bars. Even in the Mumbai metro-rail project, there is

a lot of consumption of epoxy-coated bars. In the future, to reduce the carbon footprint, the only way is to decrease the consumption of steel during the refurbishment process."

The man involved in the making of Chenab Bridge, **Shashank Rajbhoj, AGM - Design, Afcons Infrastructure**, commented, "I have witnessed that the government is more inclined towards concrete structures. But for sea bridge projects with a span of around 500 m, erecting them in steel is a more economical option. We should promote steel works in such cases, as we can avoid the foundation work being done in rivers and the sea. In fact, steel structures can also be used in various infrastructure projects. If engineers in our country are given proper guidance, we are well equipped to execute complex steel structures."

Meanwhile, **AK Verma, GM - Design, Rail Land Development Authority**, said, "For station structure buildings, the main challenge is to execute construction



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while trains are running. Hence, the concept of modular construction is of paramount importance to us. In Indian Railways, the majority of FOBs are carried out in steel. Similarly, we are also planning air concourses and through routes to be constructed in steel, as it is light in weight. Launching steel is easier than concrete and it helps speed up construction."

For his part, **Sanjiv Garg, Managing Director, Pipavav Railway Corporation**, shared some great insights on steel used in railways. "Considering the high-speed rails, the government is envisaging rolling stocks and rails would require more superior and advanced technology of steel. We are moving into a new era where we will be running trains at 200-250 km/hr within the next 10 years. Therefore, the technology will change and conventional steel technology will no longer sustain."

Throwing light on the current predicament of freight wagons, he said, "For freight wagons, steel is the mainstay for manufacturing. We are now moving into areas of special types of wagons to carry special commodities that need special grade steel. In such a scenario, we will need the private sector to come up with the technology to provide us with the wagons that are required. Currently, the current production capacity of wagons in India is 30,000 wagons, which is distributed unevenly across 15 producers. But all of them are dependent on the cast iron wheel sets manufactured by the Rail Wheel Factory in Bengaluru and Rail Wheel Plant, Bela, in Bihar, both of which have a limited capacity of around 20,000 wheel sets per annum. This is inadequate to meet the current demand."

List of 'MAKE IN STEEL 2023' Awardees

Name of Person/Company	Award Category
Dr Sanak Mishra , Former Secretary General & Executive Head, Indian Steel Association	Lifetime Achievement Award
Dilip Oommen , CEO, ArcelorMittal Nippon Steel India	Man of the Year Award
Naveen Jindal , Chairman, Jindal Steel & Power	Entrepreneur of the Year Award
Sunvik Steel	Green Factory of The Year
Tata Steel	Fastest Growing Steel Company - Large Category
Jindal Steel & Power	Second Fastest Growing Steel Company - Large Category
JSW Ispat Special Products	Fastest Growing Steel Company - Medium Category
Tata Steel Long Products	Second Fastest Growing Steel Company - Medium Category
Shyam Steel Group	Third Fastest Growing Steel Company - Medium Category

While concluding, he added, "Indian Railways is likely to soon float the tender whereby private industry can set up a wheel set manufacturing plant and the railways will give a guarantee of buying back at least the next 20 years' capacity."

Speaking candidly, **Pankaj Gupta, Founder & CEO, ROARK Consulting Engineers**, observed, "In government projects, steel is only used where they are forced to use it, like in larger spans. There is no promotional element as well for using steel in government projects. However, during the COVID phase, the Delhi Government ordered erection of hospitals using steel as an integral part, as there was a need for faster construction."

Make in Steel Awards: Highlights

Deserving steel companies and

gamechangers in the steel sector were duly awarded for exceptional work done during the past year. The 'Make in Steel 2023 Awards' were judged by an expert jury panel across categories.

TMT Rebar Report 2023

What's more, FCC unveiled the comprehensive TMT Rebar Report 2023 during the conference. It is one of the many infrastructure research studies and reports curated by FCC to help industries with an update on respective materials and products. The report acts as a source for all information needs of construction companies and industry stakeholders and is a catalyst for adopting best practices and torchbearer for all policy initiatives needed to enhance the importance and welfare of the industry – thus serving as the industry's unified voice.

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A MAN-MADE CRISIS?

As relief work continues, the Joshimath crisis in Uttarakhand appears to be the result of a nexus of unplanned urban development, absence of drainage and tunnelling activities.



Photo courtesy: Simdeep Vaidh

Man is prone to exploiting the vulnerabilities of nature. And when the vagaries of nature hit back, it leads to a 'natural disaster'. Until such catastrophes impact the basic nature of human existence, there is not much attempt to solve them. Joshimath, a town and municipal board in Chamoli district in Uttarakhand serves as a perfect example. The Uttarakhand flood of 2021 and its aftermath severely affected the region. Fast forward to 2023, the town is now sinking.

Joshimath is situated at an altitude of 6,200 ft above sea level, in the lower Himalayas. The town is situated in the middle of a hill bounded by Dhauliganga and

Alaknanda on one side and Karmanasa and Dhaknala on the other. In addition to Joshimath, several settlements can be found on the lower and middle slopes. These include Chami, Shelong, Khanoti Chatti, Animath, Vishnuprayag, Khan, Parsari, Ganeshpur, Sunil, Gaukah, Dadon, Regaon, Oucha, Auli, Kharori, Kuni, Paiyan, Khancha, Barhgaon, Painsi and Vishnupuram.

The recent crisis in Joshimath began with cracks on walls at an accelerated pace. Reports cited that owing to land subsidence, 863 buildings in the town were found to have cracks and numerous structures had moderate or major damages.

The cracks caused by land subsidence in Joshimath is not an overnight phenomenon. This has been an ongoing issue since the 1970s. In 1978, a panel headed by Garhwal commissioner Mahesh Chandra Mishra submitted a report stating that major construction should not be done in the city and the Niti and Mana valleys because they are on moraines, which are masses of rocks, sediment and soil deposited by glaciers.

Why did it happen?

Joshimath has grown in size resulting in haphazard development, as is the problem with other towns located 5,000 ft above sea level with all

development happening on loose soil. Unplanned expansion has also amended the natural flow of water; in the absence of systematic drainage, water has been forced to chart alternative routes. This water has been seeping down into the crystalline porous rocks, causing them to become even more brittle. Further, this town is located in Zone V of India's seismic zonation scheme and earthquake motion is well known to turn loosely packed, water-saturated soil to liquid.

Dikshu C Kukreja, Managing Principal, CP Kukreja Architects, says, "Many mountain towns in our country, like Joshimath, don't fall within the official urban limit. Some of these come under small nagar palikas (city councils) and panchayats (village councils) that don't follow any masterplan. As a result, development in such areas is sporadic and happens in a piece-meal fashion. Further, a lack of systematic guidelines for development in such eco-sensitive zones may have led to unregulated urban planning in the town."

Infrastructural compulsions

A report authored by **MPS Bisht, Director, Uttarakhand Space Application Centre (USAC)** and **Piyooosh Rautela, Executive Director, Uttarakhand State Disaster Management Authority,** states, "Despite being fully aware of the geological/environmental vulnerability of the area, a number of hydroelectric schemes have been sanctioned around Joshimath and Tapovan. In one such scheme, the head race tunnel of the project traverses through the geologically fragile area below Joshimath. A tunnel-boring machine (TBM) was employed for excavating the head race

What exactly is sinking or subsidence?

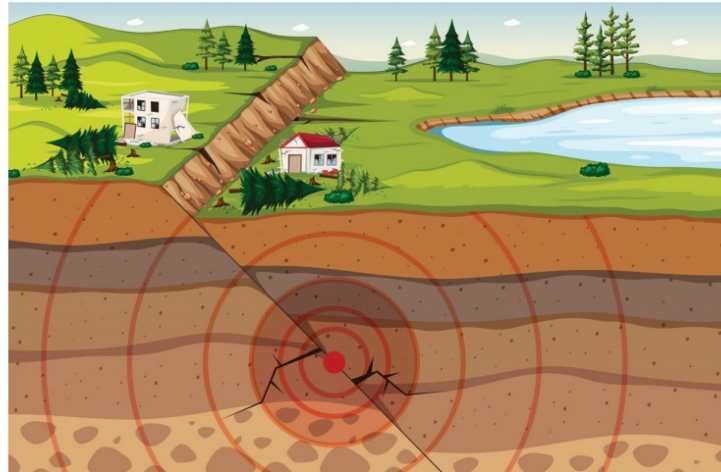


Photo: For representational purpose

Subsidence refers to vertical downward displacement of the earth's surface. It can arise from natural causes, human activities, or by activities, which destabilise natural systems.

Factors that lead to land subsidence include:

- **Underground resource extraction:** The removal of oil, natural gas or other underground resources can lead to the ground sinking and the collapse of the empty space that is left behind.
- **Soil consolidation:** When subjected to heavy loads or saturated with water, soil can harden or compress over time. The surface of the ground may sink as a result.
- **Erosion:** The ground may become weaker and more prone to subsidence as a result of erosion.
- **Depletion of aquifers:** The ground above an underground aquifer may sink as the water level drops if water is pumped out of it faster than it can be replenished.
- **Landslides and faults:** Land subsidence can also be caused by landslides and faulting because geological forces can cause the ground to shift or collapse.

Subsidence of land can cause many problems, such as flooding and harm to infrastructure and buildings. In areas where subsidence is a possibility, careful monitoring and management of land use is essential.

tunnel. In December 2009, it punctured a water-bearing strata some 3 km inward the left bank of Alaknanda near Shelong village. It has been known that the site was more than a kilometre below the surface, somewhere below Auli.

The water discharge was reportedly between 700 and 800 litre per second. The aquifer discharge was about 60-70 million litre daily, enough to sustain 2-3 million people. Even after a month, the aquifer had not dried out."

SPECIAL REPORT

Amid the current disaster, veteran environmentalist Ravi Chopra has been reportedly quoted saying that there is adequate reason to believe that what is being witnessed in Joshimath is a result of the tunnelling exercise. However, the National Institute of Hydrology (NIH) has reportedly cited that the water gushing out of cracks in the Joshimath land subsidence appears to be distinct from the water in the tunnel in Tapovan, according to a preliminary test report.

In the present day

Owing to an ongoing

investigation of the phenomenon, experts have refused to comment on the issue. CW has made an attempt to reach out to experts, including a senior representative from Wadia Institute of Himalayan Geology, who has asserted that the appropriate findings have been submitted to National Disaster Management Authority. After the land subsidence, large-scale construction has been temporarily suspended in the region. The Joshimath subsidence is being investigated by the Uttarakhand government, led by Chief Minister Pushkar Singh

Dhami. Scientists from eight institutes have submitted their reports to NDMA. Cracks have been found in 863 buildings, 505 of which have experienced serious cracks. Aside from this, 188 Litre Per Minute (LPM) of water was still leaking from the JP Colony of Joshimath. About 957 members of 286 families have been forced to relocate, and 360 families have received ₹37 million in relief.

The road ahead: Building safely in hilly areas

For carrying out any kind of infrastructure project in a hilly area, a geological and geotechnical investigation is of utmost importance," says **Shashank Rajbhoj, Deputy General Manager (Design), AFCONS Infrastructure.** "As far as possible, mega construction needs to be done in an area where there are no human settlements. If there are, then adequate measures need to be taken so that the soil does not slip due to produced vibrations that damage the houses. In the monsoon season, hilly areas are prone to landslides too, and hence, adequate precautions for the same are desired. Depending upon the geological and geotechnical investigation in different hilly regions, it can be estimated as to what can and cannot be done. Certain considerations should be made to build in such areas, the load bearing capacity of the soil needs to be adequate and if required should include approaches like: 1) Draining out water from the soil; 2) Compacting the soil; 3) Confining the soil; 4) Replacing the poor soil; 5) Increasing the capacity of soil by providing stone column and micropiling. Measure should be adopted for slope stabilisation like soil/rock nailing or anchoring with

The geography of Joshimath is prone to a crisis, which has been catalysed by the present-day developments. There are many such areas across India that can be at a similar risk. Solutions deemed fit by experts include:



VEGETATION CULTIVATION: On slopes, planting vegetation can assist in anchoring the soil and preventing erosion. Trees and other plants with deep roots are especially good at stabilising slopes.



CONTROL OF DRAINAGE: In hilly areas, drainage systems must be properly managed and maintained because poor drainage can cause land sinking. Installing culverts or other drainage structures to divert water away from slopes and stop erosion may be necessary.



ESTABLISHING SOLID FOUNDATIONS: In hilly communities, strengthening the foundations of buildings to prevent them from sliding or collapsing may be necessary in some instances. This could involve strengthening the foundations or underpinning them.



ZONING AND PLANNING: Buildings can be avoided in areas that are prone to erosion or landslides with careful planning and zoning. This may necessitate requiring the use of specialised construction methods in high-risk areas or designating specific areas as no-build zones.



KEEPING SLOPES STABLE: Stabilising slopes with methods like terracing or retaining walls is an effective way to stop erosion and landslides.

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SPECIAL REPORT

grouting chemical, benching and shotcreting, depending upon the condition of the slope. Blasting done on site can impact soil and slope stabilisation, and so if the project requires blasting, relocation of any settlements at the site is absolutely necessary.

The construction of houses in hilly region too requires a different approach as key materials for such houses comprise stone and woods. The foundation of the house is generally laid out by stone walls that are 3-4 ft high; around 2 ft of this wall is beneath the ground level. The main feature of such houses is the wall comprising of stone and wooden beams. The stone and wooden members are alternatively stacked up, with wooden members interlocking at corners. This style of wall is called *Kath-Kuni*, it does not cave in the event of tremor despite heavy shocks. As a result, in the event of a tremor, this kind of house causes little damage. Such houses are considered ideal and safe in hilly areas prone to seismic activity. These structures have stood the test of time, but building such homes have become difficult due to lack of availability of materials and skilled labour. The *Kath-Kuni* route is being gradually replaced by structures made of concrete and brick. These new buildings can be not only less climate-adaptive, but they also cost a lot to transport materials and labour. Additionally, with rising interest for normal materials, the rapid loss of forest covers resulted in the enforcement of Environment and Forest Act that restricts the use of wood from these forests. However, it may be necessary for the government to mandate the need to build houses in accordance to the age-old traditions as the new age homes



Photo courtesy: Sundeep Vaidd

In hilly areas, age-old traditions of building homes needs to be mandated, the new age homes are not fulfilling the purpose of a safe abode.

are not fulfilling the purpose of a safe abode.

Kukreja affirms, "When we plan a development, it is important to understand the town planning principles. And one of the fundamental principles is to design and plan according to the context, which means considering the natural conditions of the land, particularly in a mountainous, eco-sensitive town like Joshimath. A thorough study of the built environment in such sensitive zones should be carried out on a regular basis. The survey can also include similar areas in other states. The states can then be directed to conduct rapid research and investigation on the condition of the existing buildings in these regions. This will help in identifying the degree of damage or the degree of threat posed to the local buildings, based on which mitigation efforts can be determined."

To ensure a catastrophe like Joshimath does not occur again, here are some key takeaways to consider:

- The local bodies need to step up, and authorities who sanction permits to build and construct with little regard to strata situation should be held accountable.
- Construction activities need to be monitored and any unauthorised construction should be demolished; until it is demolished, an order needs to be issued that the premises are not to be occupied so that gullible home buyers don't fall into a trap.
- Proper land mapping should be done and only stable strata zones should be earmarked for construction.
- Periodic audits should be conducted in such areas and updated notifications on the basis of the audit surveys should be published on the municipal corporation websites.

While solutions to the Joshimath crises are underway, it is time that geological protocols and mandates are reviewed to ensure no other town in India is witness to such catastrophes.

Have a solution to recommend for the Joshimath crises? Write in at feedback@ConstructionWorld.in

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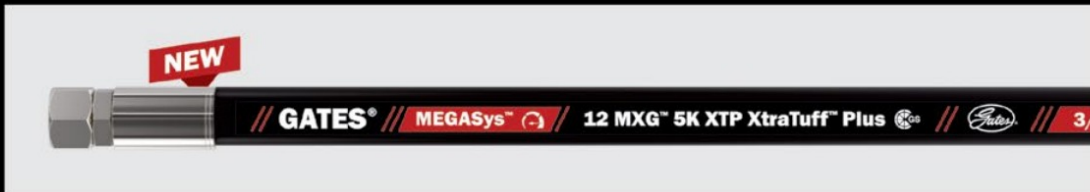
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Fuelled by H₂

MURALI RAMAKRISHNAN ANANTHAKUMAR and Dr N RAJALAKSHMI delve into the role of green hydrogen in the construction industry.

The construction sector, holistically, contributed to 9 per cent of India's GDP in 2021 and is expected to reach \$1.4 trillion by 2025. Typically, the sector includes real estate (buildings) and urban development (enabling infrastructure including schools and healthcare) segments. From an ecosystem perspective, it encompasses all materials (such as glass, brick, cement, steel and concrete) and mechanisation (including trucks and heavy machinery) in addition to other enabling infrastructure. This viewpoint allows us to examine the role of green hydrogen to substantiate the decarbonisation potential of the industry. Both the material and mechanisation aspects are heavily reliant on fossil fuels for their thermal energy dependency.

Green hydrogen

Green hydrogen is produced from electrolyzers using water and renewable electricity. Water is split into hydrogen and oxygen through electrolysis. Hydrogen is stored for further energy requirements and oxygen is vented out.

Decomartmentalising construction: Through the energy lens

The energy sector in India is

heavily dependent on fossil fuels. Typically, energy needs in the construction industry can be bifurcated into electricity and heat (thermal energy). In this regard, coal and diesel are two of the most commonly used fuels in this industry. Coal is used in manufacturing of cement, steel and bricks, whereas diesel is used in heavy machinery and vehicles like trucks, bulldozers, cranes and concrete mixers. Additionally, other oil derivatives and natural gas are used in industries to produce glass, cement and steel. Given the dependency on fossil fuel, it is imperative that some of these energy sources are

effectively decoupled through scalable alternative fuels, such as hydrogen.

At construction sites, hydrogen can be used to power heavy machinery and equipment or to replace diesel generators for power backup. It must be compressed and stored in cylinders under pressure to increase storage density. Depending on the application, it can be stored under 350 and 700 bar. It can be stored as compressed gas or cryogenic liquid and transported as such in cylinders and cryogenic tanks for ex-situ application.

The application of hydrogen in the construction industry across the

Four Key Advantages of Incorporating Green Hydrogen in Construction



Improved sustainability



Reduced carbon footprint



Enhanced energy efficiency



Improved air quality

The notion of sustainability is subjective and depends on the nature of usage. Given the high calorific value and virtually zero carbon emissions during fuel combustion, green hydrogen can improve the status of the construction industry in the long run.



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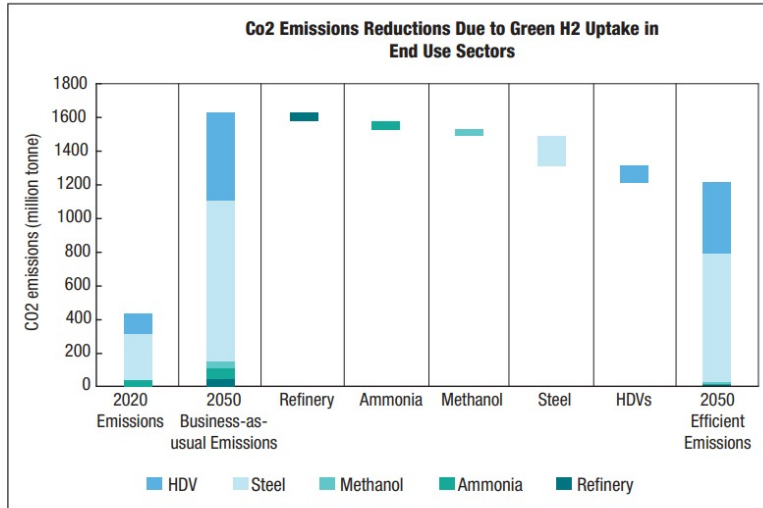
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GUEST ARTICLE



Source: RMI Analysis

globe is at a nascent stage or being carried out on a pilot basis. However, owing to safety and poor standardisation issues, most projects to date rely on fossil fuels to supplement their energy needs. This will change as countries standardise the application of hydrogen in various segments of their economy.

For material production

Most of the steel produced today comes from the blast furnace route. Typically, directly reduced iron (DRI) uses coal as a reducing agent. However, it is proven that hydrogen can be used as a reducing agent without compromising the quality. As the sector continues to explore innovative ways to decarbonise, the share of steel produced through the DRI-based route and secondary steel-based electric arc furnaces must be proportionately increased.

In case of cement production, substituting coal in rotary kilns with hydrogen should be judiciously explored. Further, a combination of electrolyser-based solutions can be used to produce electricity at source,

instead of captive power plants. The economic viability of these options are currently a distant dream. The recent nudge from the government through the National Green Hydrogen Mission is expected to bring down the costs over the next few years through economies of scale. There is a clear upside to embracing hydrogen-based solutions. For every 1 per cent of coal substituted with green hydrogen, approximately 0.93 kg of CO₂ can be abated. Similarly, replacing natural gas and coal in DRI routes with green hydrogen is estimated to reduce 1.3-1.6 tonne of CO₂ for every tonne of crude steel produced.

Adoption of hydrogen

The rate of adoption is going to be dependent on resolving four key challenges: inflated cost of production, lack of effective storage options, ill-established supply chain, and policy and regulatory hurdles. While cost is expected to reduce gradually as the market grows, the safety

aspects associated with efficient storage and retrieval of hydrogen may hinder progress. A well-established supply chain taking into account production, consumption, storage and delivery aspects will serve the sector a world of good. At present, the supply chain is either non-existent or available at a miniscule level. Finally, the lacuna in policy and regulatory aspects is expected to be filled as nodal agencies that administer the sector implement timely policies across all three aspects of the hydrogen ecosystem. Under the ambit of the National Green Hydrogen Mission, an outlay of ₹197.44 billion has been allotted. Atmanirbhar Bharat and production-linked incentives (PLIs) are other instruments that can drive the investments around the hydrogen supply chain.

In conclusion, the need for hydrogen in the construction industry is well established. Given the national goals around energy security and the voluntary commitment to the net-zero goal, stakeholders will be empowered to join the bandwagon. However, cost-effectiveness coupled with improved technology readiness (in terms of storage and delivery) will determine our ability to achieve the target of the National Green Hydrogen Mission.

About the author:



Dr N Rajalakshmi is an Advisor at the Centre for Study of Science, Technology and Policy (CSTEP), a research-based think tank.



Murali Ramakrishnan Ananthakumar is a Research Scientist and leads the Hydrogen Group at CSTEP. He holds a masters in public policy from the Lee Kuan Yew

School of Public Policy, The National University of Singapore.

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To share your views on Green Hydrogen, write in at feedback@constructionworld.in



An Equipment Galore

The recently concluded bauma CONEXPO INDIA in Greater Noida focused on sustainable technologies and experienced the largest ever domestic participation compared to previous editions.

Key policymakers from the government and captains of the industry attended bauma CONEXPO INDIA this year. During his inaugural address, **Shri Nitin J Gadkari, Honourable Minister of Road Transport & Highways, Government of India**, said, "Electric, hybrid, and biofuel-compatible machinery holds great potential to reduce the fossil fuel dependence of the construction equipment industry and improve productivity and cost efficiency outcomes for the infrastructure development and construction industries. Hence, I am delighted to see the new technology displays at this trade fair."

The inauguration ceremony also featured a special address on behalf of the host state Uttar Pradesh, delivered by **Shri Nand Gopal Gupta, Cabinet Minister-Industrial Development, Export Promotion, NRI, Investment Promotion, Government of**

Uttar Pradesh. He said, "We will soon become the only state in India with the largest number of six-lane expressways, and therefore, I am delighted that this edition of bauma CONEXPO INDIA is being held in Uttar Pradesh. By attracting large investments in the industry and infrastructure over the past few years, Uttar Pradesh has demonstrated manufacturing excellence."

This edition witnessed the largest ever domestic participation compared to previous editions, demonstrating the construction equipment industry's commitment towards Make in India. **Arvind Garg, Chairman, bauma CONEXPO INDIA, and Senior Vice President & Head-Construction & Mining Machinery Business, Larsen & Toubro**, said, "Infrastructure development in India is on an accelerated growth path, and we are

proud to serve the market with best-in-class latest technologies, which enable timely project completion and better outcomes for all stakeholders."

This edition also witnessed a power-packed presentation by **Lt General Rajeev Chaudhry, VSM, Director General, Border Road Organisation (BRO)**, on potential areas of collaboration with equipment manufacturers in the interest of nation building.

The sixth edition of the expo at the India Expo Centre, Greater Noida, closed on a high note with the launch of over 25 electric and hybrid heavy machines, more than 10,000 product displays, insightful conferences and technical sessions, and an exciting line-up of next-generation technologies at the live demo areas.

With over 600 exhibitors from 26 countries, and participation from more than 60 CEOs of leading infrastructure development

companies from both the public and private sectors, as well as key decision-makers from Central and state governments – bauma CONEXPO INDIA 2023 attracted over 41,000 trade visitors from

83 countries.

Once again, the CW team was active at the expo this year interacting with the exhibitors. The industry was upbeat with announcements regarding launches, business focus,

expansion plans and much more. Read on for key highlights from our several interactions.

And in what is successfully held every two years, the seventh edition will be held in December 2024.

ACTION CONSTRUCTION EQUIPMENT

“We aim to bring bigger cranes into the market.”

ACE - Action Construction Equipment is already a leader in the cranes segment – be it the mobile cranes or tower cranes. **Sorab Agarwal, Executive Director, Action Construction Equipment**, speaks on major products on display at bauma CONEXPO and the outlook for 2023.



Key products on display: We have introduced three of India's firsts. This launch marks India's first indigenously developed 100 per cent electric construction equipment and propels India on the global platform of technological advancements. ACE F150-ev 4X4 has been specifically designed to suit both road travel and pick-n-carry use. We are also showcasing India's largest crane, which is 180-tonne and is equipped with anti-toppling features that provide enhanced safety on-site and cutting-edge technology that makes it superior to conventional machines. So far, India has never produced aerial working platforms that are self-propelled. We have launched two models – 21 m and 27 m. The company has introduced both articulated and straight boom access platforms to cater to India as well as export markets. The company has also launched a range of telehandlers, which have primarily been developed keeping in mind the export potential alongwith domestic usage and the 35 tonne capacity 4X4 pick and carry crane, which is the largest pick and carry crane to be introduced by ACE, who is also the world's largest producer of pick and carry cranes.

Business outlook for 2023: We are starting one of the biggest crawler and truck crane production facilities in India, which will increase our output and

enable us to expand our line of models. We aim to bring bigger cranes into the market. In the mobile crane market, we are now operating at 75 to 80 per cent capacity utilisation, and are thinking about a CAPEX plan to increase our capacity by an additional 50 per cent.

AJAX ENGINEERING

“Going forward, we want to expand to the global market.”

Ajax Engineering started off as manufacturers of self-loading concrete mixers. It was niche and the company has grown leaps and bounds. It further went on to diversify into offering 360° concrete solutions. Today, the company offers batching plants, transit mixers, concrete pumps, boom pumps, and self-propelled boom pumps. **Debasis Bhattacharya, Vice President-Sales & Marketing, Ajax Engineering**, shares more...



Key product offerings: To optimise our offerings in boom pumps, we have optimised the boom length in a six-wheel chassis to have a 30 m boom pump; for the 6 x 4 10 wheeler, we have a 44 m boom length. Today, we have the self-propelled boom pump, which is a game changer. It is the first-of-its-kind in India and abroad. We have also started offering slipform pavers, which were previously imported. All of our products are indigenously designed and manufactured.

Demand drivers: For the self-propelled boom pumps, we are targeting the infrastructure segment, and building and housing. The 25 m boom is capable of applications in railways, defence, bridges, and more. For the housing segment in Tier-II and -III cities, we have an 18 m

boom, which will be coupled with the self-loading mixer and will be a mobile solution for concrete production and placement.

Business outlook on 2022: Going forward, we want to expand to the global market as well, starting with the ASEAN countries. We are focusing on consolidation post which we will look into capacity expansion. Coming out of the last two years, we have registered a 30 per cent growth and hope to be consistent at the same.

BKT TIRES

“The government’s outlook on the mining sector indicates phenomenal growth.”

BKT Tires has a global presence with exports to more than 160 countries. **Ashok Chhajer, Senior Manager-OE Sales, BKT Tires,** elaborates on his positive outlook for the mining sector...

bauma advantage: Our objective at any exhibition is to showcase our latest products and have interactions with our present and prospective customers across markets. At the event, I interacted with customers from all over the country and even abroad. Understanding the needs of customers and gaining their feedback is imperative for us as we continue to design new products that cater to those needs.

Outlook on the Indian market: The Indian market has been growing tremendously in terms of construction. The mining sector has also been booming in the past few years. The government’s outlook on the mining sector makes us hopeful of phenomenal growth in the coming years. Going forward, I believe that apart from volumetric growth, we will also see technology-driven advancements. Private companies will invest more in the latest machines and technologies, which will lead to further growth of the segment. In 2022, we have witnessed fantastic growth due to the burgeoning of the construction and mining sectors and we are confident that it will continue in the present year as well.



CATERPILLAR INDIA

“We are focused on bringing in comprehensive products and service solutions, driven by technology.”

With the push on infrastructure, Caterpillar machines are catering to the highway requirements with efficiency, productivity and technology. **Mukul Dixit, Director-Sales & Marketing (Global Construction and Infrastructure), Caterpillar India,** shares his views on the market and offerings at the expo.



Key products on display: We have displayed products for the infrastructure segment starting from skid-steer loaders to backhoes, and graders. We have also exhibited the excavator range like the 320D3 GC hydraulic excavator. Caterpillar in India has a wide range of products not just fitting one product for all applications but also tailor-made solutions. Our machines perfectly match the customers’ demand for low owning and operating costs. To further customer advantage, our machines come with simple, easy to maintain robust systems to keep the machine up and running all day, every day.

Demand drivers: With the government’s vision to boost road infrastructure and more electrification in rural areas; we are also having our products go that route. With large investments currently being made in the infrastructure sector, the customer today is keen to complete the job quickly and efficiently to capture more opportunities. Our efforts are on delivering the integrated solutions to meet their needs and help our customers build a better, more sustainable world.

Sustainability aspects: Caterpillar is more focused on supporting the customer’s bottom line and bringing in fuel-efficient machines. Caterpillar is committed to sustainability by offering integrated and differentiated solutions and leadership in technology by offering cutting-edge facilities that challenge the status quo. We aim to help customers reach their sustainability goals, including lowering emissions with a variety of solutions including machines that run on alternate fuels or technology that increases fuel efficiency, help customers build a more sustainable world, with a commitment and contribution towards a reduced-carbon future.

CRANESAFE TECHNOLOGIES

“We are known for providing solutions to mobile crane hydraulics and crane electronics.”

Manufacturers of safe load indicator systems and crane control systems, **Cranesafe Technologies** has indigenously developed systems for total crane control and safety for Mobile Cranes and also for AWP (MANLIFT), **Ganesh Upadhye, Partner**, shares more...



Key product offerings: We help our Indian customers in repairing electronic parts and boards. However, in case of parts that are beyond repairs and non-availability of the same parts from OEM then in the mobile cranes and AWP (MANLIFT) segment, we completely replace the control system with our own hardware and software. It is a major achievement for us as we were the first in India to offer this in such a capacity for mobile cranes and AWP (MANLIFT).

Salient features: Safeload indicator systems are truly versatile and customised as per crane requirement. It is a user-friendly robust rugged system. The operator using this system is able to understand our system pretty easily. For the crane control system, right from manufacturing to the execution stage, we provide all the details to the customer. We also train them on identifying the problems as the diagnostic feature of our systems is easy to follow.

Technology push: We use all the latest technologies like controllers, and PLC programme, along with our expertise. We are known in the market for providing solutions to crane hydraulics and crane electronics. The critical problems in hydraulics, pneumatics and electronics in any mobile cranes brand gets a solution from us.

FIORI ASIA

“We have displayed three models of self-loading mixers.”

Products from Fiori Asia are designed in Italy and Made in India. **Siva Ramalingam, CEO, Fiori Asia**,

shares his view on the Indian market...

Key products on display: This is our first show in India. We have displayed three models of self-loading mixers, which are 2.5 cu m, 4.3 cu m and 5 cu m per batch. They offer 30-40 per cent higher productivity. The operator visibility is also higher. We are bringing this product to the Indian market exactly as it is sold in Italy and 65 other countries. We are not modifying or de-specifying any aspect.

Outlook on the Indian market: India is the biggest market for self-loading concrete mixers. In our estimate, three out of four of these are consumed in India. Our products are designed in Italy and made in India.



KOMATSU INDIA

“We have been making our machines bio-diesel friendly.”

Komatsu India's Chennai plant is the global hub for dump truck and hydraulic excavators manufacturing and distribution. The company is already engaged in exporting machines to Africa and the Middle East. **Yasunori Fujii, Managing Director, Komatsu India**, elaborates on the company's focus on sustainability and new launches.



Key products on display: The main exhibit is the HB365LC-1 Hybrid Hydraulic Excavator, which has 20 per cent reduced fuel consumption. Almost all our models are bio-diesel ready, which means that Komatsu is on the lookout for a good partner to supply quality bio-diesel. Both fuel suppliers and equipment manufacturers can work together for carbon neutrality.

New launches: In bauma Munich, Komatsu displayed the 20 tonne and 3 tonne class electric excavators. But these need to be modified for the Indian market. It is a cost-heavy product so it will take some time for us to roll it out for the Indian market.

Sustainability: Komatsu has been contributing to sustainable construction by making our machines bio-diesel friendly. Further, the hybrid model will be rolled out for the Indian market if there is demand from the customers. We also have unmanned equipment, with smart elements, that have been launched in Japan, Europe and the USA.

Business outlook for 2023: Both, the domestic and overseas market, has recorded good sales this year. Komatsu India expects this trend to continue.

KYB CONMAT

“KYB Conmat offers full range of self-loading mixers.”

With over 13 years of experience in the industry, KYB Conmat is one of India’s leading manufacturers of concrete equipment, offering a wide range of products such as stationary and mobile batching plants, compact plants, tower plants, paving machines, transit mixers, concrete pumps, and self-loading mixers.

Kalpesh Soni, Vice President, KYB Conmat, shares more on the company’s offerings and market scenario...



Products on display: We displayed our full range of new self-loading concrete mixers at bauma CONEXPO INDIA 2023. All these machines are IoT enabled, BS-4 and ARAI compliant, and offer better fuel efficiency, high productivity, better mix quality, faster loading and discharge due to an advance blade design and electronic batching system with printer, produce more concrete per batch by optimised drum capacity, which reduces the overall cost per cubic meter of concrete. Further, these self-loading mixers offer superior manoeuvrability by single joystick control, 4-wheel steering/4-wheel drive system, also offer superior operator comfort due to reversible operator seat and balanced load distribution on front and rear axles.

Current market: India’s market for construction equipment, concrete construction equipment is experiencing growth due to increased government

investment in infrastructure development. KYB Conmat holds a top three position in most segments, including batching plants, paving machines, transit mixers, and self-loading mixers and is growing in concrete pump segment.

Opportunities: As can be seen, 2023 is shaping up to be a fantastic year for construction. With technological advancements and high demand for services, the only way to go is up. With an emphasis on rebuilding infrastructure, sustainable buildings, and smart cities, construction companies that embrace the industry’s changing landscape will have more opportunities. Investments in infrastructure are the main growth drivers of the industry.

Sustainability: KYB Conmat has used its flexible, digital and modular manufacturing systems to reduce throughput time and overheads, offering more value for money to its customers. The machines are user-friendly, equipped with state-of-the-art automatic controls, and the batching plants have the latest multi-language SCADA software and self-diagnostic features to minimise downtime.

MAHINDRA POWEROL

“We intend to capture a 25% market share in the industrial engines segment by the next four years.”

With key offerings such as diesel gensets ranging from 5 kW to 625 kW, Mahindra Powerol has been focusing on road and highway construction. **Sanjay Jain, Senior VP & Business Head, Mahindra Powerol,** elaborates...

Key products on display: At bauma, we have showcased products from our industrial engine division, which offers engines from 24 HP to 400 HP for various emission and non-emission applications in India. These engines are meant for all the construction equipment manufacturers wherein they use these engines in their equipment.

We displayed 48.5 HP BSV CEV engine and 74 HP-112 HP CEV BSV Engine at the expo. These



BAUMA CONEXPO INDIA 2023

engines are designed basis our in-depth understanding of different applications including forklifts, pick and carry cranes, next gen cranes, mini compactors, tandem compactors, soil compactors, pneumatic tyre loaders, backhoe loaders, self-loading concrete mixers, harvesters and so on. At Mahindra, excellent fuel consumption, lower maintenance cost and cold start ability are the DNA of every engine we design and build.

Outlook on the Indian market: For the diesel engines catering to the construction equipment industry, India is currently the biggest growing market in the world. As the government's focus is heading more towards the development of projects, the requirement of equipment for construction will resultantly soar higher. We are growing at more than 50 per cent every year, which is high for any industry. We are gradually penetrating the market.

Market share: Today, we have a market share of 20 per cent and we wish to become a major player in our business segment. We reached this 20 per cent share fast, despite being a relatively new player. There are competitors serving the engines for more than 50 years, but we have reached this share in just 10 years' time. We intend to increase the market by another 10 per cent in the next four years.

Sustainability: Mahindra Research Valley (MRV) in Chennai is one the best R&D centres having more than 2,000 engineers deployed to enhance the engine technology. We are the first to launch BS-V engines for the construction segment, which complies to the latest emission norms. The BS-V engines are most fuel efficient, with lowest cost of ownership. With new projects coming up in extreme northern parts of India, the requirement for cold start ability of the engines is of paramount importance, and we have proven cold start ability in our BS-IV and BS-V engines.

Green initiatives: Currently, the diesel engines are preferred in the construction equipment sector, however, as and when the demand for engines running on hydrogen or biofuel arises, we are well equipped to cater to those technologies as well.

Business outlook: After the dull period of COVID, we had a good growth in the year 2022. In 2023, as the industry grows, being the suppliers to the industry, we shall also grow. We are highly active in the segments that the government is focusing on today like road and highway concreting.

SANY HEAVY INDUSTRY INDIA

“The new machines come with advanced design, ease of operations, and reliability.”

Sany has announced a completely new product vertical that will offer road equipment to the Indian road contractors.

Dheeraj Panda, COO (Sales, Marketing & Customer Support), Sany Heavy Industry India, shares more...



Key products on display: We have announced a completely new product vertical that will offer road equipment to Indian road contractors. The newly-launched machines come with Sany's technologically advanced design, ease of operations, and reliability. With the government making large-scale investment plans for the development of road networks, Sany's asphalt machine range with powerful engines and reliable components is poised to be the ideal solution in various work environment and road construction. The new product range showcases our manufacturing strength and technological expertise, which will translate into enhanced productivity and profitability for our customers.

Sustainability and automation: This will be our focus areas as they will improve the efficiency and quality of our products. In terms of our product offerings, we have seen that the usage of telematics, automation, and machine control technologies in our equipment has helped our customers become more productive and efficient.

Business outlook for 2023: The past year has been a reasonably successful one for us in terms of general infrastructure growth if you look back on it. The National Monetisation Pipeline (NMP), the National Infrastructure Pipeline, and the Prime Minister's goal of one-window clearance through the Gati Shakti project all represent significant government investments in infrastructure. The forecast is positive for 2023. Looking at the government's plans and pipeline, we anticipate another successful year for overall infrastructure expansion.

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SCHWING STETTER INDIA

“We aim to launch a minimum of 25 new products this year.”

This year marks a significant milestone for Schwing Stetter as the company celebrates its silver anniversary of 25 years in India. **VG Sakthikumar, Managing Director, Schwing Stetter India**, speaks on the market for their products, and more...



Key products on display: We have launched 14 new products along with our regular products such as batching plants, concrete pumps, recycling plants, TSRs, self-loading mixers, wheel loaders, excavators, piling rigs, truck cranes, and horizontal directional drilling machines. We aim to launch a minimum of 25 new products this year that will impact the dynamics of the construction industry and stimulate infrastructure innovation in the country. We are pleased to launch the first 14 products that are built to improve the efficiency and competence the sector needs.

Supporting green construction: A certain amount of green energy such as solar electricity, is used to manufacture our devices. In the future, we will use more green energy during the production process, which will result in lower emissions from our machines' exhaust fuel and exhaust gas. We make sure the noise pollution does not exceed the permitted decibel range. When compared to diesel engines, electric power is cleaner and is available for many of our machines.

Business outlook for 2023: Last year (in 2021), the company witnessed its highest turnover since its stint in India, notwithstanding the pandemic and global slowdown. We expect our turnover to increase by 53 per cent this year based on the sales projection, and due to an increase in the product portfolio of the Schwing Stetter table. Close to 28 dealers have been appointed pan India to reach this target and we have crossed this target as of December 2022.

SDLG

“We are launching a 5-tonne, fully electric V-loader.”

In 2023, SDLG expects a growth of 25-30 per cent Y-o-Y. What's more, the company plans to

commercialise its electric range in the market by the end of the year. **Surat Mehta, Director-Productivity & Retail Development, SDLG**, shares his outlook on the company's focus, market and more...



Key products on display: We have two diesel variant products – the E6135Fi 13.5-tonne excavator and L933 3-tonne V-Loader. Both these products are fuel-efficient. We have used advanced electronics to manage hydraulic efficiencies to the best level. For reliability, the products have been structurally enhanced to offer flexibility and application in tough areas.

Indian market: Despite a turbulence due to the pandemic, SDLG saw a growth of more than 50 per cent YoY in 2022. The demand drivers have primarily been road construction, urban infrastructure and port handling of bulk materials. For wheel loaders, we have seen demand from concrete.

Sustainability: We are launching a 5-tonne, fully electric wheel loader. This is where we are committed to creating a better tomorrow.

Business outlook for 2023: In 2022, we introduced a lot of new models in the market. Apart from the 8-tonne and 13.5-tonne excavators, we also introduced the 7-tonne wheel loader in the market.

TATA HITACHI CONSTRUCTION MACHINERY

“We expect moderate growth in the coming year for the industry.”

In continuation of celebrating over 60 years of Tata Hitachi in India, the company has introduced the new prototype of the new upcoming model, 3-tonne class mini excavator, NX30. The commercial sale will start in the next financial year. **BKR Prasad, Head-Marketing & Product Development, Tata Hitachi Construction Machinery**, shares more...



Key products on display: We have displayed our versatile, CEV IV-compliant backhoe loader model Shinrai Prime, our newly-launched, indigenously-

developed, NextGen 3-tonne mini excavator model NX30 along with some of our mid-range construction excavators. Within excavators, mini excavators are the fastest-growing segment.

Market scenario: The market has been volatile over the last three to four years. COVID waves led to challenges from the supply side. Component shortages are followed by the challenge of price. Because of these huge cost-ups, we are not able to pass them on to the market, which has hit our bottom-line. Despite these challenges, the excavator market is continuing to be robust. We should see a good 15 to 20 per cent growth in the overall market as compared to the last financial year.

Business outlook for 2023: Next year is the penultimate year before elections in H1 2024 and we expect the government to continue its focus on growing the economy through CAPEX and focus on execution. However, this will be balanced with fiscal responsibility and limited borrowing. Further, the national highway construction, a major driver for construction equipment, is facing headwinds in accelerating execution and is projected at best to touch 31 km per day this fiscal as against a reduced target of 33 km per day. Keeping this in mind, we expect moderate growth in the coming year for the construction equipment industry.

TECHNO INDUSTRIES

“The charter 2030 has already been laid out to ensure sustainable and organic growth.”

Catering to various sectors such as automobile, mining, pharmaceuticals and more, Techno Industries caters to various sectors. Nirag Chokshi, Managing Partner, TACKLERS, Techno Industries, shares more...

Key products on display: We have displayed the rubber tyre gantry cranes, which are mobile and ideal for heavy applications. We also have the gantry cranes to lift 50-100 tonne precast segments in metro and bridge construction. These operate in tandem effect and help in moving along the casting and stockyard. Apart from



that, we cater to various sectors such as automobile, mining, pharmaceuticals and more. We offer gib cranes and overhead EOT cranes, and for hydro projects, we offer 200-tonne turbine lifting cranes.

Outlook on the Indian market: We are quite optimistic. In the budget, there has been a 7.5 per cent GDP growth foresight. The infrastructure investment will offer a boost to the segment.

Sustainability aspects: Our machines use efficient lower KW gearboxes with the right safety factors. Lifting a 50-tonne crane requires lesser energy. We use regenerative devices such as the power-saving mode to conserve energy.

Business outlook for 2023: Looking at the positive shifts over the last year, the company has outperformed this year and we will continue to do so. We have a vision lined up for the company till 2035. We also expect IoT and analytics to gain more traction. Preventive maintenance will help the machines perform better, reducing downtime. All of these are part of Industry 4.0 along with robotics and automation. We also expect more standardisation coming up.

Growth enablers: In India, we are yet to see mini-excavators, mini-road rollers, and tailor-made machines take off. In the coming years, we can expect MSMEs to garner a profit with these.

Vision for growth: We want to be one of the top companies to offer standard and non-standard solutions. We hope to not only have four manufacturing units across the country but also have 25 offices in the capital of each state. We are looking to grow the Asian market by expanding to the Middle East and Africa and gradually to Europe and the USA. The charter 2030 has already been laid out to ensure sustainable and organic growth.

TEREX INDIA

“We expect higher electrification in our products by the end of next year.”

Terex India has introduced its environmental range that is now used in solid waste management. Jaideep Shekhar, Managing Director-Asia & EMEAR, Terex India, shares more about the company's focus on sustainability and expansion plans.

Key products on display: We have a wide range

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on display from our mineral processing business. We have track-mounted, and wheeled and static crushing and screening equipment, and a wash plant. We also have some of our lifting equipment on display such as the pick-and-carry Franna cranes and the newly launched 45-tonne rough terrain cranes. All the products are made in India.



Outlook on the Indian market: There is a lot of emphasis on infrastructure development and our products are well-suited to be part of this journey. In terms of lifting business, there are many projects coming up such as metros, the high-speed rail and more. We have also come up with our environmental range, which is now used in solid waste management.

Sustainability: We are doing a lot of work on electrification. Sixty per cent of our products on display are electric. Hybrid technologies use lesser fuel and offer more productivity. The journey to electrification is ongoing and we expect to have higher electrification in our products by the end of next year.

Plans for capacity expansion: We are currently building a new office block in our factory. Out of our 45-acre plant in Hosur, Karnataka, we are putting up sheds for the pick-and-carry cranes across 15 acre. We are also looking at greenfield options to expand across the country. We have a mature dealership network with some partners being more than 20 years. It is expanding in the business of rough terrain cranes and pick-and-carry cranes. In the last year, we have added 14 new distributors and we aim to get 12-13 more this year.

ULMA FORMWORK SYSTEM INDIA

“We expect a minimum of 15% YoY growth in 2023.”

Ulma Formwork System displayed the ONADEK recoverable modular formwork, among others. Surajit Ray, Country Manager, Ulma Formwork System India, elaborates on the same, the outlook of

scaffolding in the Indian market, and more...

Key products on display: We have the ONADEK recoverable modular formwork on display, which is a more flexible slab formwork. This system consists of structural galvanised steel members made of special rectangular hollow sections. It



makes a 4'x 8' grid matching that of a plywood, which eliminates cutting of full-size plywood. The drophead system works efficiently in flat slabs for early striking and helps achieving faster slab cycle. For infrastructure, we have the BRIO system, which is a scaffolding-cum-shoring system for working safely at elevated heights. Apart from these, we are also showcasing the modular Aluminium panel slab formwork known as CC4 and modular wall panel formwork LGW. The Virtual Reality glasses will help visitors to have real life experience of our factory at Spain.

Outlook on the Indian market: The utilisation efficiency of technology-based system formwork has been catching up steadily. We have experienced intensive activities in the infrastructure and allied segments. We have also observed that in the last few years, there have been increasing enquiries and sales of formwork systems such as ours for all types of projects and across all categories of customers engaged in construction activities.

Business outlook for 2023: The year 2022 probably have been the best for Ulma since 2009. Yes, there were difficulties, but post-pandemic, companies adopted technologies of all sorts to complete their stalled projects as fast as possible – usage of our type of formworks have been a prominent factor aiding faster completion of projects. We expect this momentum to continue and help us achieve a minimum of 15 per cent YoY growth in 2023.

New launches: We have a new multi-panel column modular panel system, which eliminates any special corners or universal panels for columns and core walls. Every panel can be fit into any geometry inside or outside. We are also coming up with a rail-climbing formwork system capable of adapting to inclined structures. We will be launching these systems by 2023.

| CW |



Gmmco: One-Stop Solution for Construction and Infra Needs



Said V Chandrashekar, Managing Director and CEO, Gmmco, "Gmmco is part of the CK Birla Group. Throughout our journey of 55+ years and 35+ years of association with Caterpillar, we have been a trusted partner for our customers by demonstrating superior customer service over the many decades. Our biggest strength is our highly committed, passionate, and skilled people who are pushing boundaries to exceed customer expectations. We are continually leveraging digital technology to provide a seamless experience to our customers in conducting business with us."

On the role of product support in business, **Prashant Bisen, Senior VP, Construction Industries, Gmmco,** said, "Machine uptime and availability are directly proportional to the success of the business of the customer. In the 55+ years of heavy earthmoving equipment business, we have aced

ourselves in providing best-in-class aftermarket product support. We have strategically positioned our customer support engineers across the territory to ensure a minimal service response time. Our wide network of parts delivery touch points and optimised supply chain operations assure parts availability within the need-by date. Through our assured parts availability and rigorously trained service engineers, we promise a quicker mean time to repair to our customers. We run various customer support contracts that are customised based on the requirement of the customers. Through these contracts, we ensure superior machine performance, lower machine breakdowns and higher machine availability."

Speaking on digital business, Bisen added, "We have equipped ourselves to offer a gamut of online digital services. Our equipment monitoring solution enables customers to monitor their machine and its performance remotely using a smartphone. Our Gmmco Assist mobile application helps our customers to transact with us digitally by ordering parts and booking a machine service through the app. We are actively present across major social media channels for our customers to interact and collaborate with us. We have a wide appreciation amongst our customers for being



Prashant Bisen
Senior VP,
Construction
Industries, Gmmco

physically and digitally present with them to enable their success."

"Customers prefer purchasing construction equipment through a financing option. More than banks, it is the NBFCs that command a higher market share in equipment financing. Higher uptime of our machine resulting in higher revenue for our customers and better resale value of our



Magesh Swaminathan, Head of Sales - Construction Industries, Gmmco

equipment are the major drivers for the trust of financing institutions on us," said **Magesh Swaminathan, Head of Sales-Construction Industries, Gmmco,** while speaking on the role of NBFCs in construction equipment sales.

On customer demands and expectations, Swaminathan said, "A customer seeking our products can be largely classified into life cycle cost and life cycle value. Caterpillar equipment are known for their lower refill capacities, higher maintenance intervals, and better component life minimises the total cost of ownership thereby benefitting the lifecycle cost category customers. Higher fuel efficiency and enhanced productivity demonstrated by Caterpillar equipment make it a go-to-choice for lifecycle value category customers."

Cat product range.

| CW |



“Any project with a strong technology component is of interest to us.”

- **Vinayak Pai**, Managing Director, Tata Projects

The name Tata Projects has become synonymous with India’s development across a plethora of sectors. In an event held in the nation’s capital recently, **Vinayak Pai, Managing Director, Tata Projects**, spoke to CW about the company’s key focus areas and its ability to navigate the current geopolitical climate.

What similarities or differences do you see when it comes to project execution in India and abroad?

Project execution everywhere, by and large, follows the same principles. However globally, the front-end definition of a project is much stronger. A lot of time is spent on devising the initial plan and concept before project execution begins. In India, this stage, in particular, is not so robust. Later on, this leaves room for changes, owing to which timely project delivery takes a hit. Hence, precision is desired in planning and finalising the front-end design and definition of the project so that the project execution plan is not riddled with constant changes.

How will the National Infrastructure Pipeline (NIP) from projects and the production-linked incentive (PLI) scheme enhance India’s infrastructure growth?

We believe the PLI scheme has given a lot of emphasis to sustainability-related investments apart from aiding the manufacturing sector pan India. As far as the infrastructure sector is



concerned, a good deal of investment is pouring into the infra domain, both at the Centre and state levels. A lot of emphasis is being laid on growth of infrastructure with the requisite budget allocation; much of this has to do with the urbanisation of the Indian economy. The development of Tier-I and Tier-II cities has augmented the demand for better connectivity and people are keen to have a better lifestyle as well.

When it comes to the revenue mix, what part comes from Indian and overseas projects? What sort of international projects are on your radar?

Right now, our international projects are limited. We do transmission line projects in Bangladesh, Africa and some other parts of Asia like Thailand. We are

executing some projects through our oil, gas and hydrocarbon arm in the Middle East. Ten per cent of our revenue comes from international projects; the rest of it, which is the major part, is India-driven.

Going forward, what sort of projects will be a priority, keeping in mind the company’s short-term and long-term revenue goals?

Any project with a strong technology component is of interest to us. For example, in the Mumbai Trans Harbour Sealink, the first, longest orthotropic steel deck (OSD) was used, which is quite unique. Such opportunities denote our ability to deal with complex projects. Likewise, sustainability and decarbonisation are a huge focus area for us. So, projects that centre on green hydrogen, green ammonia and those catering to power storage and converting waste to energy will be our key focus areas.

Given the geopolitical situation, do you feel the Middle East offers better prospects than Europe?

The geopolitical and climate-related changes that are happening are all real. A year ago, we dealt with COVID-19, which was a major disruptor. I believe businesses have to learn to operate against the backdrop of these uneasy developments that can come from anywhere. At Tatas, it has always been our

5 MARQUEE PROJECTS

<p>Tata Projects is constructing the challenging Package 2 of Mumbai Trans Harbour Link. Once completed, MTHL will become the longest sea bridge in the nation.</p>	<p>It includes a museum building, artificial water body and jetty, prototype of ancient Lothal town and its rich heritage, museum galleries to establish a timeline of the known facts about India's maritime history</p>	<p>The construction of the new Ginger hotel at Santacruz, Mumbai is being executed by an all-woman engineering team from TATA Projects.</p>	<p>The New Parliament building will comprise an area of 64,500 sq m to accommodate any future increase in the number of members for the two houses of Parliament.</p>	<p>Tata Projects is building multiple sections of Eastern & Western Dedicated Freight Corridors which will enable Indian Railways to run faster trains.</p>
Mumbai	Lothal region, Gujarat	Mumbai	Delhi	Multiple Locations
Mumbai Trans Harbour Link	National Maritime Museum	Ginger Hotel	New Parliament Building	Dedicated Freight Corridor Corporation

endeavour to build a resilient business with a strong base load. Our ability to execute projects with lesser resources and innovative technologies, ensuring timely deliveries, keeps us steady in such uncertain times. Thanks to the oil prices, the Middle East at this point in time is better off but investors don't make decisions based on the trajectory for the next few months. It's a long-term affair. So, as a company, we will continue to focus on all geographies.

Tata Projects is involved in the construction of Jewar International Airport, the fourth largest airport in the world. Can you tell us something about this ongoing project?

We have an aggressive schedule of 30 months for this iconic project; it will change the mobility dynamics of NCR.



Our ability to execute projects with lesser resources and innovative technologies, ensuring timely deliveries, keeps us steady in such uncertain times.



Sustainable methodologies, digital solutions and remote monitoring are being used to speed up construction. We want it to be a benchmark of success in predictable project delivery. We are happy to add that all stakeholders involved in the project, including the Uttar Pradesh Government, have offered us tremendous support. Hence, I can confidently say that we will be

able to manage the expectations of this project with ease.

What measures has Tata Projects taken towards clean energy solutions?

We are focused on projects that centre on decarbonisation and sustainability. All these projects are highly technology-driven; hence, we are developing technology partnerships and acquiring the skills required to bring them to fruition. We are working with the Indian Institute of Petroleum to reduce the carbon footprint of our construction sites. We are trying to understand how to use biodiesel at some of our sites; likewise, we are increasingly trying to use renewable power at our sites. All this augments our idea that business in the long run needs to be sustainable and help make the planet more sustainable.



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SPECIAL REPORT

Will Government Spending Accelerate Construction in 2023?

With the Centre and states spending on capex, the private sector must chip in and drive the balance.

The Centre's masterplan indicates a list of mega infrastructure projects. While the Gati Shakti is considered a huge step towards achieving India's \$5 trillion economic goal, reports indicate that India would need five times more spending towards infrastructure development to get there. Given the current global economic slowdown and increasing inflationary pressures, private investment will be the key to success.

Setting the tone

While the Union Budget has set the right tone to attract private-sector investment, **Padmanabhan Raja Jaishankar, Managing Director, India Infrastructure Finance Company (IIFCL)**, says, "I have always held that capacity generation is done best by the public sector and obviously the infrastructure sector is the driver. The sector is in its transformation stage to the third decade. If you need private investments, you need a system that builds confidence not just among investors and developers but other stakeholders. In the beginning, we saw buoyancy in the PPP model that was introduced. From 2006-2015, we saw a spade of private investments. This was followed by a lull between 2015-2020. But now again we see



Padmanabhan Raja Jaishankar, Managing Director, India Infrastructure Finance Company (IIFCL)

revival." The sector has had its learnings in the beginning, especially on the structural side with land acquisition, delayed approvals, contractual obligations, the long-term nature of infrastructure, and contracts that demanded redressal and renegotiations. Despite the lack of a system, the successes were greater than the failures.

Jaishankar also points to the Kelkar committee that recommended many suggestions for institutional reforms that went into effect in 2016 and are now bearing fruit. "We are seeing financial issues being sorted out with the consolidation of banks,

new-age financial instruments such as InvITs, and renegotiation clauses. All this builds visible confidence in private players. Over the last two years, we have seen an increase in bond investors. The latest bond issuance of the NHAI InvIT is witness to retail investor participation. These will build onto tradability and, consequently, liquidity and debt." The 19 InvITs have AUMs worth ₹2.5 trillion. This has proven to be a good instrument for the release of capital for existing developers.

For the developer community, marquee projects are coming up. A number of sectors are participating in PPP such as power, transmission, renewables, airports, railways and ports. The HAM model has also now come into play. The demand for

larger projects is growing, which are now driven by technology, and so is their cost. The number of developers cannot keep pace with the demand. This is where the HAM model can play a role.

For his part, **Vinayak Pai, Managing Director, Tata Projects**, says,

"Private-sector investments will only accelerate this year and beyond. Some contributing factors will be the PLI scheme and the China+1 policy for multinationals. FDI is picking up in segments like semiconductor manufacturing and data centres. As capacity utilisation is up, new investments will come in as they cross 75 per cent. And the past year was the first full year post-COVID. It takes time to build investor confidence. Yet, many movements that will encourage growth are happening."

In Pai's view, availability of contractors is a challenge as the lumpsum EPC is unique to Asia where the risks are passed to the contractor. That's the reason for limited players who often struggle with delays and overruns. "To get more players established, we have to make our investments predictable. I am not a big fan of 100 billion investments because half of it goes into funding delays and overruns



Vinayak Pai, Managing Director, Tata Projects



rather than completing projects on time. This is where effort is required.”

There is a shortage of manpower at most sites in India. While NHAI and the transport ministry have set the standard where smaller contractors are encouraged to work on highways, technology and digitisation are absolutely critical. Pai emphasises upon the need for wider adoption of technology and AI to drive performance.

Focus: Railways and Roads

The Budget has given railways and roads primary focus. Of ₹10 trillion, ₹5 trillion have been allotted to these two sectors.

“Roads and highways and railways have had three times more capex allocated to them in the past four years,” affirms **Jagannarayan Padmanabhan, Director & Practice Leader Consulting, CRISIL Market Intelligence and Analytics (MI&A)**. “To that extent, this Budget continues to follow a trend rather than shifting gears. Of the split between the two, a significant uptick has happened on roads; a 30 per cent growth just this year. Traditionally, allocations used to happen but never absorption. At least, these two ministries have been able to absorb the expenditure.”

In his view, the roads and power sectors have shown how the private sector can be brought in intelligently. “The Gati Shakti framework is more on the railways, and will take another three to four years to yield benefits. Even on a dedicated freight corridor, the Gati Shakti terminal has been bid out and a private player has won it. If such terminals are built in a transparent manner, private investments will follow.

In terms of multimodal logistics, freight is being given importance, adds Padmanabhan. “Today, nobody is complaining of a bad road. It is a significant step up in the last decade and we are making similar transitions in the railways.” Going forward, he hopes for a modal shift from roads to railways. The objective of the National Rail Plan is to create 50 per cent of freight movement to come through the railways; today, it is less than 30 per cent.

Sustainability matters

The sustainability and green energy focus has been a major part of not only this Budget, but the industry as a whole.

As for special incentives available to promoters and investors in green energy, Jaishankar says, “We have

set a decent target for ourselves and the Prime Minister has already announced the net-zero target by 2070. Going from almost a negligible proportion, the renewable energy mix has now become significant, occupying almost 30 per cent of the energy mix. Fossil fuel-based energy is reducing in proportion.”

The government has also announced green bonds and some energy players have raised green bonds to the tune of \$6.8 billion globally. In the international market, one does see incentives owing to the presence of verifiers in addition to certifications. “In India, we need to develop a verification system to build the eco-system,” adds Jaishankar. “As we are just beginning to develop the market, incentives are slightly difficult. But more market-based incentives can be included going forward.”



Jagannarayan Padmanabhan,
Director & Practice
Leader Consulting,
CRISIL Market
Intelligence and
Analytics (MI&A)

In the case of green bonds, policies are being drafted by the state governments along with the Centre. The RBI policy mentions bringing out a paper on green deposits. “I do not know if there are any standards prescribed for it,” comments Jaishankar. “But there is a push and promotion for it. The green deposit may be perceived as a specialised aspect and could be used to shore up liquidity in the system.”

Project execution: Overall growth

The focus is now on the benefits the construction industry will reap from the increased budget spend and the money coming in from private investments.

“It would be a directly proportional relationship between the two,” believes **Madan Sabnavis, Chief Economist, Bank of Baroda**. “If the Government is spending, especially on roads and housing, you could expect a multiplier effect in terms of overall growth and backward linkages to the related sectors.”

That said, project completion and delays have been plaguing India, globally too but more so in India. “Predictability of projects is a definite challenge, and the reasons are manifold,” says Pai. He shares that, in India, little time is spent on the front-end definition of the project and planning before tendering, whereas, globally, almost 25-30 per cent of the effort is done before the tender is out and the concept is finalised. “A clearer front-end definition and more thoughtful planning before



Madan Sabnavis,
Chief Economist,
Bank of Baroda

How can we realise the dream of accelerated investment and backward linkages?

Madan Sabnavis, Chief Economist, Bank of Baroda, shares his perspective:

- From 2013-17, India had a really high investment rate, in the region of 32-34 per cent of GDP. Then, after the NPA controversies in the banking sector, there was a rapid decline in the investment rate. It had come down to 26-27 per cent of GDP; today, we are in the region of 28-29 per cent.
- When we had these high growth rates of investment; our capital formation rates had reached 33-34 per cent, which is required to build a \$5-7 trillion economy. These are idle numbers we are talking about, though; at the end of the day, investment must drive growth. If we don't see this kind of investment, despite signs of revival, we will not be able to achieve this growth.
- Everyone is impressed and going slightly overboard with the ₹10 lakh crore economy. India will have around ₹300 trillion GDP in 2023-24. Assuming 30 per cent of will be investments, ₹90 trillion has to be financed. Who will invest? When the Central Government aims to do ₹10 trillion, 1/10th of the total, in my mind, we have to be a bit guarded.
- The Central Government is playing its role to increase its capital outlay. But at the end of the day, it is the private sector that has to chip in and drive the balance. The state governments are also spending on capex and it is comparable to that of the Centre.
- A private entity will not invest unless there is a return on equity, assets and shareholder value; they have to be profitable. Whereas, the government has no such constraints because they don't make a profit and are bang on target on the capex. States don't have the same advantages as the Centre because they are constrained by the fiscal deficit number. They can spend 3-3.5 per cent of GDP or GSDP; for anything above that, they need to get special permission from the Centre and the RBI, which does not come easily. The FRBM rules actually constrain the states.
- When we look at the ₹10 trillion mark, ₹1.3 trillion is actually transfers given to the states. It is in fact a ₹8.7 trillion spending that the government is doing. Of the distribution of this, the largest sector receiving

tendering is key.”

Sabnavis questions if RBI increasing interest rates is a factor that comes into play during cost overruns. Also, can an increase in global commodity prices affect execution? To this, Pai responds, “To some extent, ministries recognise this and there are price variation clauses attached to the contract. If commodity prices go up, based on some indices, the cost is recalibrated. The cash cycle liquidates the ability of EPC companies to do things in time. In addition to poor front-end definition from the government, there is a convoluted process for dispute resolution due to a lack of definition.” He cites that the problem for the industry is not profitability or volume; it's working capital.

Improving cash flow of contracting firms

EPC contractors undeniably face high interest rates and cashflow issues in both government and private projects.

Padmanabhan calls it an age-old problem with age-old solutions. “At the level of the Centre, there is a certain amount of capacity building, at least in the ability to put out meaningful projects. At the state level, there is not as much capacity.” However, to reach a \$5 trillion economy, we need capacity building, technology transfer and monitoring. Many of these factors have financial implications. “Good project preparation, institutional capacity, some trust in the private sector and resolving outstanding issues efficiently can go a long way for us.”

“In the late 90s, when we decided to go in for universal banking, we had specialised DFIs with knowledge about financing infrastructure and other long-term purposes,” says Sabnavis. “This was lost along the way. It was felt that commercial banks could do it and they have a basic ALM (application lifecycle management) mismatch.” A bank's normal long-term lending period is for three to five years, not 10-15 years. “Now we have NaBFID and we need to see how it takes off. The thought process was to have a parallel development of the corporate bond market and specialised instruments through which infra companies could borrow. This, too, did not pan out as expected. RBI brought in certain enhancements for infrastructure projects that banks have not really

- it is railways, followed by defence and roads.
- Interestingly, states have been found to not spend immediately. While they do spend a lot on construction, roads and rural infrastructure, they go slow in the first six months. The majority of the states spend only 20-30 per cent of the allocation in the first seven months. Once they see the revenue increasing from the Centre, they expedite the process. In case they realise that the revenue is not increasing, they cut down on the discretionary expenditure and, therefore, the capital expenditure.
 - Apart from capex, a lot of expenditure comes in through the Pradhan Mantri Awas Yojana, which is actually a revenue expenditure. It has been a significant factor when we talk of the construction industry because it provides subsidies and incentives for housing, both urban and rural.
 - The Central Government is definitely one of the drivers of investment in the economy. But, eventually, the private sector needs to come in. When the Centre decides to construct a road, it requires cement, steel, chemicals and more; as the demand for these go up, there is a tendency for capacity utilisation to go up too. Automatically, one goes in for a fresh round of investment and that is how the circle really begins.
 - Remarkably, nobody seems to be unhappy about the Budget. But this is a zero-sum game. If the government is spending ₹10 trillion on investment or capital expenditure; they have actually cut down on expenditure elsewhere. They have cut down on subsidies, rural and relief programmes, and more.
 - This is what we economists have been saying – try and cut down on revenue expenditure wherever possible. This is a bold decision because this is the last Budget before the elections in 2024, when we will have an interim budget, to begin with. Therefore, we all expected certain populist decisions. The government realises that even though we talk of the economy as the fastest growing, there is something lagging in private investment. While the logical explanation is that once the government starts spending, it will crowd in private investment, the questions we need to ask are: Why has it not happened in the past four years? What is holding us back?
 - The Budget is only one aspect to bring about growth. There are policies outside the Budget as well, and we should keep an eye on these. The Budget just gives us an indication that the government is spending a certain amount of money. We need the private sector to follow up. Only then, can we realise the dream of accelerated investment and backward linkages.

taken on. Everyone prefers safer lending options.”

Sabnavis maintains a return to the concept of DFIs, though he is not sure how it will work out now after pushing them out 20 years ago. While REIT and InvIT are good ideas, given the sheer volume of investments, he questions: “Do we have a clear idea of how we can finance them?”

Enhancing construction progress

One significant factor to enhance construction progress is technological intervention. Different industries in the EPC and construction space are at different levels of maturity. Pai shares the example of the oil, gas and hydrocarbon businesses and how they never undertake a project

without a 3D model, completely integrated with all details, bills of quantities, safety, and more. “The construction industry unfortunately sees this as a cost without understanding the benefits,” he says. “In one of our projects, we are integrating our planning into the BIM models; even approvals are done through an app. It’s all there. What matters is the will to implement it and see the value instead of the cost.”

Clearly, the increased budget spending will positively impact the sector. In addition, Rajshekhar Saha, Director - Capital Projects and Infrastructure, PwC, points to other enablers, like



Rajshekhar Saha,
Director-Capital
Projects and
Infrastructure, PwC

better contracting mechanisms, dispute resolution, better front-end engineering and DPRs before tendering. Also, the risk sharing between stakeholders needs to be balanced to enable effective progress.

All considered, increased government capabilities, the introduction of technology and new guidelines under PPP/EPC bode well for a brighter future.

- SHRIYAL SETHUMADHAVAN

(This story has been reported from a recent webinar by the FIRST Construction Council. To view the same, scan the QR code on Pg 98.) | CW |



Skillfully Employed

Here is an app to tackle the lack of skilled labour that plagues the construction and infrastructure sectors.

The shortage of skilled labour in construction has been one of the biggest challenges in the industry. Despite the booming growth, companies are still struggling to fill key roles on the job site and, as a result, are at risk of missing out on jobs or extending project timelines. Tackling this critical issue is Bengaluru-based startup, ProjectHero, that aims to provide a platform for workers from across the country and reduce time and cost overruns owing to the lack of manpower.

The genesis

The idea for ProjectHero came about when **Satya Vyas, CEO, ProjectHero**, and the cofounders were running a general contracting business focusing on office interiors and managing about 500 workers at the time. But the business hit a snag as the lockdown came in. "We realised we were losing an immense amount of money because



Satya Vyas,
CEO, ProjectHero

of selecting the wrong subcontractors or not being able to supply the required manpower onsite," shares Vyas. "We dug deeper only to find that general contractors, subcontractors and workers were operating in silos. There was no common platform for the three entities to coexist." He points out that price and quality discovery for the right contractor and worker was an issue.

In that vein, the construction industry is extremely informal in terms of worker management, order bidding and the discovery of work onsite. "There was no work history or formal portfolios, allowing people to get away with doing sub-par work," he adds. "Along with this, we also saw smartphone penetration and data consumption go through the roof. These were some factors that contributed to us developing ProjectHero; it was the right

time for us." Along with a push from the government to formalise the sector, the learning curve associated with technology has also reduced considerably.

Bridging the gap

What was previously done through referrals or a labour contractor is now done by one app that cuts out the middleman. This is where ProjectHero comes into play. It eliminates the pain point of the supply-demand gap by giving tools to contractors and developers to float their worker requirements on the app. "By onboarding everyone onto the same platform, contractors can reach 20-25 times more workers," elaborates Vyas.

The app is a network of contractors, subcontractors and workers. As Vyas points out, "A subcontractor can find work for themselves or other workers and assess the types of orders in their area." To assess the skills of a worker, ProjectHero conducts simple image tests based on their trade and sub-trades, along with a KYC verification. This allows contractors to gain insights into the skillsets of a worker. Similarly, workers get an idea of the financial strength of the company they have applied for and the workforce as well. On the training front, the app offers content that users can consume for free. Down the road, Vyas foresees the company also offering skilling solutions.

Generating awareness

Prior experience with the

FACT FILE

Year of establishment: 2021

Top Management: Satya Vyas, Pukhraj Grewal, Raghu Chopra, Sidhant Panda

Employees: 40

Total users: 480,000 workers, 70,000 sub contractors, 25 general contractors

User demographic: Labour as well as contractors

Types of jobs covered: 15 trades of the construction industry like electrical, plumbing, HVAC, shuttering

contracting market gave Vyas key insights into which belts the workers come from and the type of their tradework. He emphasises that there will always be an offline channel that cannot be bypassed. Hence, a mix of online and offline strategies was required to onboard people. "Some part of our onboarding process is completely online and product-led. People can create their profiles, get verified and use the app. The other set of activities is onground where the ProjectHero team goes from place to place to onboard workers." Once the app hit a maximum number of workers, word spread automatically to the subcontracting community. Today, the platform has 500,000 workers and roughly 75,000 contractors.

Vyas also states that ProjectHero is "a conduit for communication". When it comes to getting people onboard, especially workers, the problem is not tech or design illiteracy. "It is a communication problem. So, we get people interested through notifications and WhatsApp messages."

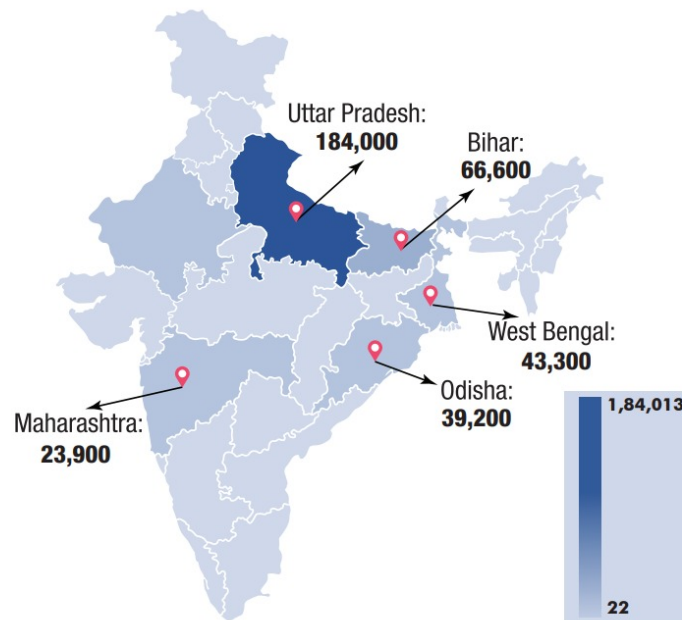
The app currently sees the most demand from Tier-I cities. Because of the massive infrastructure push from the government, the app has also seen jobs being created in Tier-III and IV cities.

The business model

The app is a membership-driven network. There are a considerable number of free users that eventually convert to paid subscribers. "We are completely focused on growing the number of subscribers," says Vyas. "We also plan to bring in some ancillary services in the future."

The next step

ProjectHero has recently received \$3.2 million in seed funding from



According to ProjectHero's data, the largest chunk of supply of registered workers came from Uttar Pradesh, followed by Bihar and West Bengal.

Ankur Capital and Omidyar Network India. "A lot of the investment will go into developing the product and building a stronger team," reveals Vyas. "We are setting a precedent here, so we have to experiment and find that sweet spot. Simultaneously, we will be exploring various price points and growing subscribers."

Vyas believes India is a big enough market to take on at the moment. "But we are open to opportunities. Because if we are able to tackle this problem in India, the question then arises, where are the workers going from here? Expanding abroad will be in the books for us in eight to 12 months."

On the back of the increased spending on infrastructure, ProjectHero is poised to flourish. "If India has to become a large economy, small towns will need to grow into mid-level towns, which

will create more employment opportunities. And ProjectHero will play an important role in this."

On the business front, once ProjectHero's network is more robust and self-propagating, the price and quality discovery in the industry would be sharper and more efficient. "Right now, roughly \$5-\$6 million worth of contracts are live on the app," elaborates Vyas. "But as we move forward, we are aiming to have 10-15 per cent of the spend go through ProjectHero."

Despite a somewhat bleak current scenario, the way ahead looks promising to Vyas. "This is the time when great companies are born and market leaders are decided," he says. "If you have a problem and you are passionate about solving it, you should jump into it feet first."

- SNEHA IYER | CW |

Know of a thriving startup? Write in at feedback@ConstructionWorld.in



SPECIAL PROJECT

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Metro Via Water

Work on Mumbai's first metro viaduct over a water body was completed in 123 days. Here's how!

The wait to witness a metro viaduct pass over a water body was over with the last span of the 550-m Kasheli Creek metro viaduct in the Mumbai Metropolitan Region (MMR) being erected. This is part of Phase 1 of the Mumbai Metro Line 5, connecting Thane to Kalyan via Bhiwandi. The Kasheli Creek bridge – first to be crossing the creek – comprises 13 spans, including nine on water, with each span being 42.23 m in length with 15 segments. What's more, the spans were erected with the help of launching girders in around four

months – precisely 123 days.

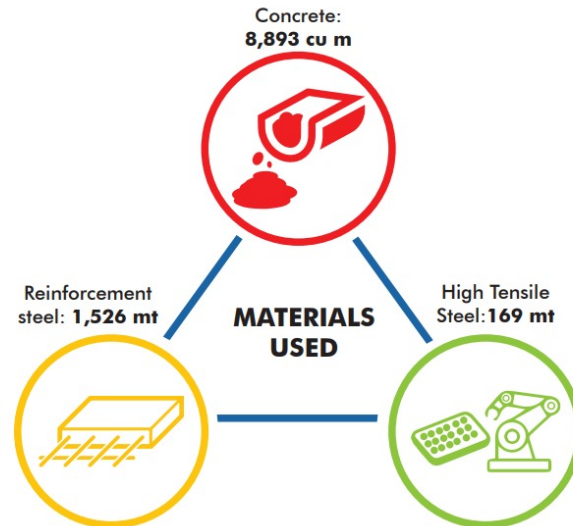
The bridge has been constructed by Mumbai-based Afcons. Asked how the construction was achieved in just 123 days, **Sukesh Singh, Project Manager, Afcons Infrastructure**, replies, "The day-to-day activities were monitored at a micro level and exclusive resources were allocated."

The plan

Initial establishments like a temporary jetty to facilitate construction inside water were first

erected after necessary permissions and approvals. Thereafter, major components such as piling, pile cap, pier, pier cap and segments as superstructure were executed.

"The piles were constructed using a reverse circular drilling (RCD) machine," shares Singh. "A barge of 2,143 mt capacity and crawler crane of 150 mt along with vibro hammer, diesel generators and tugboat were used." He adds that the shutter arrangement for the pile cap was built by supporting on a permanent liner of piles. The piers and pier caps were cast by



making supporting arrangement on pile caps.

The major difference in constructing a metro line over water compared to land is different logistics arrangements. In a marine-based project, all logistics must be done via a temporary jetty whereas on land, all the required material can reach exact span locations. It also requires additional floating devices with provisions to carry heavy equipment like a RCD machine and cranes required for marine construction. "Special safety precautions like life jackets, proper access to floating devices and standby divers are to be ensured," says Singh. "While executing superstructure erection, such as launching of segments, every single segment was to be fed from the land, i.e. rear feeding by trolley

arrangement requiring additional resources and time.

In marine construction, meticulous planning and close monitoring are extremely important. The movement of material and resources need to be manoeuvred as per tidal conditions, which needs experienced supervision and required hydrological data.

Tech talk

Multiple techniques were adopted for construction of the viaduct.

In piling, Afcons used the RCD machine that, as Singh says, was mounted on permanent liners, and to carry out the piling work, a temporary platform on temporary

liners was fabricated, assembled and installed. "For the pile cap, pier and pier cap, we capitalised the advantage of an adjacent existing road bridge, with which we transported our material by means of a tyre-mounted hydraulic crane. Even the concreting was carried out by keeping the boom placer on the bridge."

A hanging shutter arrangement was used for casting the tie beams at navigational spans and segment feeding was done with the help of a trolley arrangement from the rear end of launching of segments.

Challenges involved

Like any other complex project, the construction of Kasheli Creek bridge was challenging.

"The rotary drill machine choked frequently due to entanglement of unwanted material," reveals Singh. "The team was forced by necessity to remove the drilling arrangement completely and reinsert the same after cleaning." As a major portion of the bridge was over water, the team had to depend on barges and tugboats for construction work.

Project Details

Project: Metro Line 5
Location: Thane to Bhiwandi
Construction cost: ₹8.57 billion
Expected completion: End of 2023
Total length: 12.7 km
Developer: MMRDA
Contractor: Afcons Infrastructure

SPECIAL PROJECT



The Kasheli Creek bridge comprises 13 spans, including nine on water, with each span being 42.23 m in length with 15 segments.


However, tide conditions made the manoeuvre risky and tricky. The marine equipment was moved only during the high tide period.


Casting of tie beam in navigational spans became a challenge as it was below the high tide level. There was a tight window of four


hours for construction every day.


However, owing to meticulous planning and close monitoring of equipment and processes, the team was able to construct 22 tie beams within four months. The use of hanging platform methodology instead of conventional methods saved over 60 per cent of the time required for fixing collars for the precast pier caps.


Measures to Ensure Onsite Worker Safety


- 

A life jacket was mandatory for each worker. No one was allowed to enter the tugboat without one.
- 

All the openings, i.e., access from land to water as well as access on barges, were barricaded.
- 

For all shifts, divers were always available onsite.
- 

Special safety training and daily toolbox talks were conducted for creating safety awareness.
- 

Special mock-up drills were conducted at the creek location from time to time.
- 

Hazard Identification, Risk Assessment and Control (HIRAC) was prepared for works at the creek and compliance of the same was monitored as per requirements.

Precautions and more

Before starting work in the marine environment, various studies were carried out. This included tidal variation by scalar observation periodically, geotechnical investigation and preparation of a scheme according to available site conditions. Based on the scheme, material, machineries, equipment and resources were identified and mobilised in advance.

This bridge is part of Phase I of the Mumbai Metro Line 5. With almost 75 per cent of the project completed, the remaining work is in progress and is expected to be completed by the end of 2023.



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SPECIAL SECTION

CW DESIGN BUILD

BUSINESS INTELLIGENCE FOR REALTY DECISION MAKING

ARE NET-ZERO GOALS TOO LOFTY?

India is keen to become a net-zero carbon economy by 2070 and the real estate sector has a key role to play to achieve this objective.



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- **Advantage Micro Concrete**
- **Interaction:** BCD Group



The Power of ZERO

Net zero is the most effective strategy for mitigating climate change and global warming.

The presence of a 'zero' in a report card is a bad idea unless the report card pertains to the energy consumption or the greenhouse gas emissions of a building and in a broader sense the nation itself.

Across different sectors including real estate, decarbonisation has become increasingly significant as the nation moves toward a net-zero carbon economy by 2070. Globally, the built environment is responsible for 75 per cent of greenhouse gas (GHG) emissions, with the building sector on its own accounting for 37 per cent. In India, about 22 per cent of total emissions are from the building sector, which is also one of the largest consumers of natural resources.

Although the two terms 'carbon neutrality' and 'net-zero carbon' are used most frequently to define the requirements for taking action to mitigate climate change, there is a significant lack of clarity regarding what these terms mean.

Understanding net zero

"Like any new metric," says **Autif Sayyed, South Asia Lead for Green Buildings, Climate Business Department, International Finance Corporation (IFC), World Bank**



Autif Sayyed, South Asia Lead for Green Buildings, Climate Business Department, International Finance Corporation (IFC), World Bank Group

Group, "there is a risk of misuse of the zero energy and zero carbon standards. As these standards are new, end consumers are often not aware of what they imply. Unfortunately, there has been some ambiguity on how to measure the performance of buildings to classify them as zero energy or zero carbon. The global community is now coming to agreement on these standards. The most common myth is that just

by switching to a 100 per cent renewable source of energy, a building can be classified as zero energy. Most global platforms now

require that a building should first reduce its need for operational energy through efficient design before resorting to renewables. Another important criterion is third-party validation of the building's actual performance. The World Bank Group's EDGE green building certification requires that a building reduces its energy consumption by at least 40 per cent compared to a local baseline, and then meets the remaining demand through renewable energy (onsite or offsite) or carbon offsets. Carbon offsets also need to be validated by trusted global bodies such as the UN."

Voicing a similar opinion, **Sunita Purushottam, Head of Sustainability, Mahindra Lifespace Developers,**



Sunita Purushottam, Head of Sustainability, Mahindra Lifespace Developers

says, "Net-zero energy can be achieved by reducing the energy demand through climate responsive design (passive design), embracing energy-efficiency (active measures),

and renewable energy integration through onsite or procuring the remaining energy from grid. A building with net zero energy consumption means that the total amount of energy used by the building on an annual basis is equal to the amount of renewable energy created on the site or by renewable energy sources offsite. Zero carbon, another key terminology in the sustainability ecosystem, refers to how we can reduce the amount of carbon dioxide (CO₂) released from a product or service. Getting to net-zero carbon is tougher as opposed to only net-zero energy.

“Becoming net zero involves

breaking down the unnoticed efforts that go into the construction process,” says **Suraksha Acharya, Founder, Midori Architects**, “including tapping, documenting manufacturing building products, materials, their transportation to the project site and construction. This is referred to as embodied energy (energy consumed pre-building operation) or embodied carbon (carbon emitted pre-building operation). Although this energy is only 20 per cent of the overall energy consumed during the operation of a building, be it a home or office, this has been sadly overlooked. Climate change urgency is time-sensitive



Suraksha Acharya,
Founder, Midori Architects

and a carbon-free built environment mindset must be adopted.”

Adding clarity on the additional classifications of net zero, **Mili Majumdar, Managing Director, GBCI India and Senior Vice President, USGBCA**,



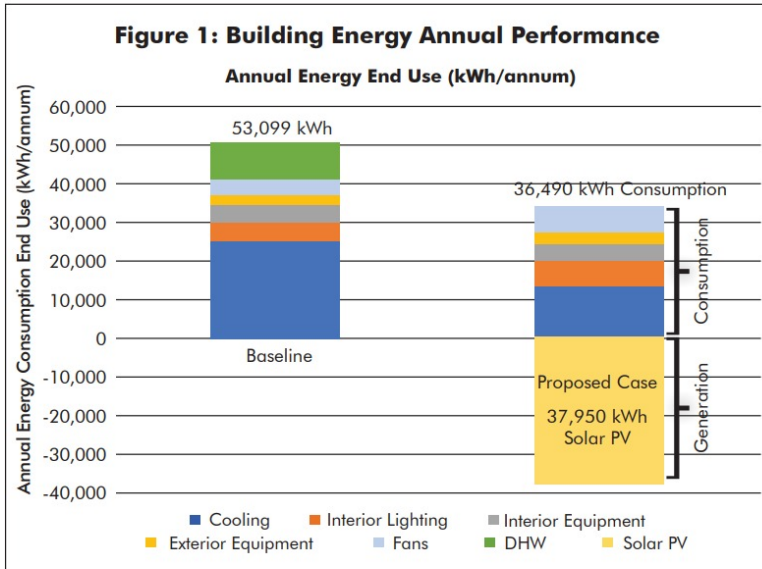
Mili Majumdar,
Managing Director, GBCI India and Senior Vice President, USGBCA

explains, “Net zero refers to all greenhouse gases being emitted into the atmosphere. A company’s greenhouse gas emission are classified into three scopes. Scope 1 and 2 are mandatory to report, whereas Scope 3 is voluntary and the hardest to monitor. Scope 1 emissions are direct emissions from company-owned and controlled resources. Scope 2 emissions are indirect emissions from the generation of purchased energy from a utility provider. Scope 3 emissions are all indirect emissions – not included in Scope 2 – that occur in the value chain of the reporting company, including both



Photo courtesy: Midori Architects

Aeon House, a zero carbon home in Chennai, has reduced the cost of construction by ₹600 per sq ft.



Source: Midori Architects, Aeon House

upstream and downstream emissions. In other words, emissions are linked to the company's operations."

Architects and designers use 'green design', a most favoured term in the dominion of architecture and design. "Most green design to date is about reducing operating energy, either through early-stage passive design strategies or through active mechanical strategies such as adding solar panels to offset energy consumed, or both," elaborates Acharya. "Terms like green and sustainable that are synonymous and interchangeable are used often by environmentalists and marketers,

keen on preserving natural resources. A zero-carbon building is a highly energy-efficient building that is fully powered from onsite and/or offsite renewable energy sources and offsets."

When it comes to projects that are on the drawing board or ongoing, a defined set of protocols will propel them towards the net-zero goal. However, in India, as in many countries around the world, a good deal of the challenge also lies in making existing real estate (that has been around for years and will be around for 50 to 100 more years) net zero. Retrofitting is the only way forward

in such cases unless we want to demolish and rebuild.

Scope and retrofitting

"The real-estate sector, as such, has a massive scope in helping India realise its net-zero goals; there are a good deal of existing buildings that have been around for years and will be around for five more decades," avers Purushottam. "Moreover, there is a huge potential in India to construct more buildings. Even if you assume that 60 per cent of the infra that is to be built by 2030 is not there, that is the opportunity we have over here. Existing buildings that are badly designed will need retrofits or may need twists in the way they are getting operated because they will exist for another five decades. So, it is safe to assume around 40 per cent of the stock would need retrofitting and the remaining 60 per cent that is yet to be built can be built with net-zero goals, net-zero energy and net-zero carbon design. Let us understand that even in the built environment that encompasses essential infrastructure apart from real estate, a similar trend is indicated."

According to a JLL report, retrofitting implies three types of interventions:

- **Deep retrofit on the whole building:** Focus on significant works of size or scale that result in a fundamental change to the building structure and/or services.
- **Deep retrofit on MEP equipment:** Focus on significant works of size or scale that result in a fundamental change to the mechanical, electrical, and plumbing (MEP) equipment in the building.
- **Light retrofit:** Focus on performance optimisation and the basic remodelling, replacement or adaptation of

Total		43,436,022.60	47,216,442.70
Cost/Sq.ft		4,608.64	5,009.75
Difference in Cost		3,780,420.10	
RETURN ON INVESTMENT		BASELINE	NET ZERO
A	Electricity consumption in kWh/Year	53,099.00	36,490.00
B	Electricity generation from PV Panel	-	37,950.00
C	Cost of Electricity Bills/Year	584,089.00	0.00
RETURN ON INVESTMENT IN YEARS			6.47

Source: Midori Architects, Aeon House cost comparison

existing building elements that tend to concentrate on a single aspect or feature.

Is the price right?

Whether it is retrofitting or a brand new net-zero abode, one must remember that India is a price-sensitive market. Thus, good intentions and pricing need an alignment so that end-users don't feel the pinch.

"It is a myth to believe that energy-efficient buildings cost more; developers are also incentivised to make green buildings," opines Majumdar.

Sayed says "First, the perception that green buildings are exorbitantly expensive needs to be tackled. If energy-efficiency is imparted right from the early stages of the building design, the need for relatively expensive renewable energy can be reduced. It has also been demonstrated in many buildings that by reducing the need for mechanical cooling/ventilation and electric lighting through incorporation of passive design features, the capital cost of building green can be minimised. The cost-benefit ratio for green starts looking better when we consider that the average electricity tariffs in India changed from ₹3.4 per unit in 2009 to ₹6.15 per unit in 2020, while the average cost of large-scale solar power dropped from ₹18.4 per unit to ₹2.7 per unit in the same period, making the switch from fossil-fuel powered electricity to renewables more profitable. This is directly linked to lower cost of solar photovoltaic panels and the availability of net metering in many states of India."

Aeon house

Offering a direct comparison of the costs saved in building a net-zero energy home vis-à-vis a conventional home, Acharya points



Photo courtesy: Mahindra Lifespace Developers

Mahindra Eden in Bengaluru is set to be India's first net zero energy residential project by 2027.

out, "In terms of cost, if we compared a conventional bungalow of similar size to Aeon house a zero carbon home based in Chennai, it would require ₹600 per sq ft less to construct, considering diesel generators as backup over battery, heat pumps over solar water heaters, standard single glazing without high-performance glass and Solar PVs that would account to the bulk of capital expenditure. However, it must be noted that the real operational cost (op-ex) would be reduced drastically to 0 kWh per sq m annually for our Zero Carbon Home (ZCH) accounting for the free electricity generated onsite and exported to the grid through net metering. The RoI we can expect with a zero-carbon building is 6.47 years or less given the decreasing cost of solar panels." (see table on RoI in previous page)

Benefits of net zero and role of rating agencies

All the experts agree that rating agencies like IGBC, GBCI, GRIHA

and EDGE have furthered the cause of net zero and encouraged developers to build and consumers to purchase such properties. In the real-estate industry, pursuing a net-zero strategy provides opportunities for all stakeholders. Environmental factors improve long-term financial performance, which benefits shareholders. This also results in higher property values, increased tenant attraction and retention, and increased investment returns for clients. In commercial spaces, offering a work environment that aligns with a broader philosophy of sustainability has proven successful in attracting and retaining skilled employees. According to a Harvard University study, certified green buildings have increased cognitive performance by 26 per cent.

It is said that not all heroes wear capes – so if every building, or in the larger perspective the real-estate sector, wishes to be a champion of the environment, an ecological hero, all it has to do is adopt net zero. After all, it's the zero that matters!

| CW |



Destined to Design

BV Doshi will be remembered for not only the projects he designed; but as the first founder dean of CEPT, he also created a roadmap for future professionals to be rooted in understanding, designing, planning, constructing and managing human habitats.

It takes a lot to be a legend – more so because the term defines people who continue to inspire us in a world that is fast changing. If we apply this criterion to the dominion of architecture and design, the moniker becomes rarer. One man who makes the cut is Balkrishna Vithaldas Doshi, often referred to as the ‘Father of Indian Architecture’. The architect, who passed away on January 24, 2023, in Ahmedabad was India's first Pritzker laureate. He was also a recipient of the Padma Bhushan and the Royal Gold Medal from the Royal Institute of British Architects (RIBA), among other prestigious awards, for his valuable work and contribution to architecture.

Doshi's projects may not be ‘glamorous’, as defined currently, but offer us much food for thought. The intellectual minds who line up tomorrow to study architecture will be encouraged to think about the tales of form and function he has drafted in India. Even though he collaborated with Le Corbusier and Louis Kahn, two towering and influential modern architects, his work has an inventive quality that defies a particular style and strikes a deep personal connection with the people who live in the country and their culture. He set important directions for urbanism and architectural practice in a young independent India by attempting to combine modern concepts with indigenous traditions in his works, fusing Indian vernacular styles with European modernism and brutalism, as seen in Tagore



Balkrishna Vithaldas Doshi (26 August 1927 - 24 January 2023)

Memorial Hall built in 1966 and Premabhai Hall located in the old city of Ahmedabad, among others.

A visionary, Doshi was aware that a developing nation like India would need a reference point of its own in architecture and design; this affirmation ultimately led to the birth of the School of Architecture and Planning (Ahmedabad, 1966-2012). Doshi was the founder, former director and chairman of the institute, which was renamed Centre for Environment Planning & Technology (CEPT) University in 2002.

“BV Doshi has been instrumental in the way architecture is being practised in India,” says **Jaagrut Patel, Principal Architect, Jaagrut Patel and Associates**, based in Ahmedabad. “Numerous students of CEPT continue to define the built

environment of India even today. CEPT, which focuses on understanding, designing, planning, constructing and managing human habitats, is based on his ideology.”

Apart from teaching at CEPT, Doshi taught at the Massachusetts Institute of Technology as a visiting professor; Philadelphia, University of Pennsylvania; Champaign, Illinois, University of Illinois; Houston's Rice University; St. Louis' Washington University; and the University of Hong Kong; among others. He also delivered lectures at prestigious educational establishments worldwide and was a member of the international committee that prepared the International Charter on the Education of Architects, which was sponsored by the International Union of Architects and UNESCO in

1995. Further, he was a recipient of honorary doctorates from McGill University in Canada and the University of Pennsylvania in the US in 1990.

Although his professional achievements were larger than life, Doshi was known to be delightful, profound, motivating and rooted. He always said, *Anand Karo* (celebrate life)! "He had the habit of writing fictional narratives to conjure the right images when he was working on any project," recalls **Yatin Pandya, Principal Architect, Footprints E.A.R.T.H.** "He read one out to the trustees of NIFT at a board meeting. The story had elements like a settlement, a secret spring and sacred water. He made it so believable that one of the

trustees, who was completely unaware of his fictional expertise, asked, 'Did you find the sacred water? We could sell it', only to be bewildered by the fact that the narrative was completely imaginary. So that was Mr Doshi. Even in a serious meeting, he was a professional with a playful mind of his own enjoying his work and life to the fullest."

Further, Doshi had the unique ability to help people grow and discover themselves in a new light. "He could extract the best out of you without making you feel uncomfortable," adds Pandya. "As a young architect I had written about architecture in the local language, which Mr Doshi had read. When I met him, he urged me to write

more. Being from a vernacular medium, I had a language complex of sorts but he insisted that I should write and discover my hidden talent, and so I did. Later on, I would photograph numerous projects that he had designed. Simply being himself, he could help you discover your innate qualities."

Indeed, in times to come, architects and designers would continue to be thankful to have BV Doshi to fall back on to understand the fundamental concepts of architecture and design through an Indian lens. It wouldn't be incorrect to say that what Satyajit Ray is to Indian cinema, Doshi is to Indian architecture. And it will be a herculean task to fill the void he has left.

| CW |

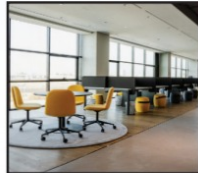
BREAKING NEWS

CW DESIGN BUILD
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“We have an existing land bank of 6 million sq ft on our books.”

- **Angad Bedi**, Managing Director, BCD Group

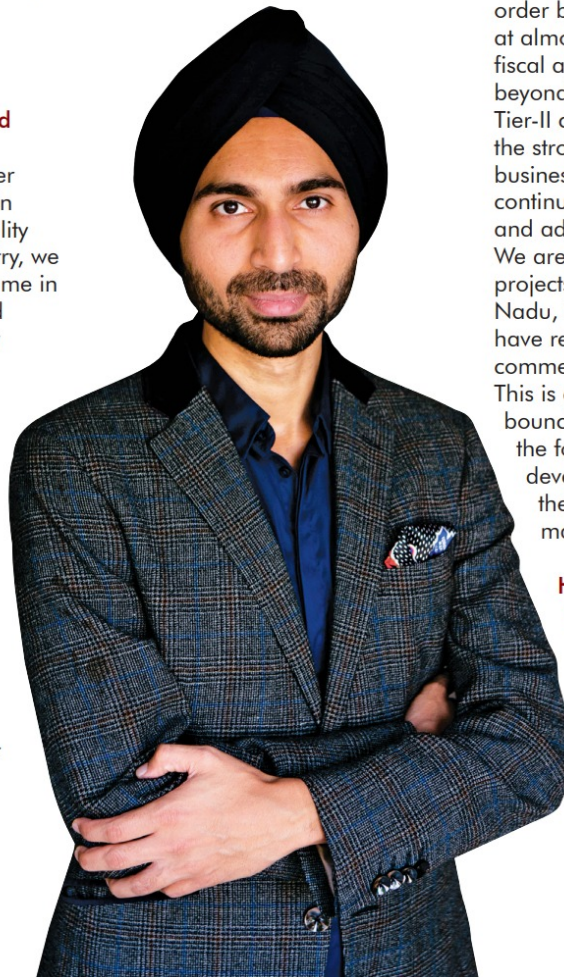
Headquartered in Delhi, BCD Group operates out of Bengaluru and executes projects pan India in an efficient manner. From complete towns to high-rise buildings for reputed builders, steel plants and hotels, the company has also launched its own real-estate projects enabling its transition from a construction company to a customer-facing brand. **Angad Bedi, Managing Director, BCD Group**, speaks on the company’s journey and expansion plans.

Kindly tell us about the brand BCD Group.

As an organisation with over seven decades of experience in building and constructing quality infrastructure across the country, we have emerged as a trusted name in the industry for customers and developers. Over the past few years, we have partnered extensively with international consultants to bring global expertise, from design and delivery to formwork and CRM systems, with companies from Dubai, Saudi Arabia and Israel forming key partnerships. We are focused on bringing first-time solutions to India that enhance the value creation for our partners, clients and stakeholders. Unlike a traditional contractor that offers basic solutions, we are focused on providing state-of-the-art services that

include construction, development, engineering, funding and consultancy and take care of projects from excavation to handover.

Today, we offer services that span the residential, commercial and industrial segments and are emerging as an organisation bringing change across the value chain, thereby enriching the sector.



Tell us about the company’s performance last fiscal. What are your expansion and growth plans going forward?

After a difficult pandemic period, the real-estate sector has bounced back rapidly and we have mirrored the recovery. While post COVID projection was blind, our turnaround in terms of turnover, execution and delivery exceeded our expectations. Our projected order book of ₹5 billion was closed at almost ₹10 billion in the last fiscal and we continue to grow even beyond metros and in Tier-I and Tier-II cities. This is a testament to the strong fundamentals our business is built on and we will continue to invest in key markets and add value for customers. We are developing residential projects across Karnataka, Tamil Nadu, NCR and Uttar Pradesh and have received several key industrial, commercial and residential projects. This is a showcase of the market bouncing back and BCD India is at the forefront of helping developers turn around their projects in the fastest manner possible.

How has technology adoption changed construction in real estate? What are some innovations in machines and technologies?

The Indian real-estate industry has significantly evolved over the years with the inclusion of

technology, which is bringing efficiencies across the value chain. From using precast cement to fast-track construction with the use of drones and other systems to monitor progress, technology is acting as a catalyst in the streamlining process. Similarly, enterprise resource planning (ERP) systems are being widely adopted in facility management; execution timelines, CRMs and post-handovers have been taken over by mobile applications; technology has simply transformed the way markets operate.

Given the scale and size of the projects your firm undertakes, can you tell us about the equipment bank and skilled manpower you have in place for timely execution?

The infrastructure and real-estate sectors are among the biggest employment generators in the country, employing millions of people. As a leading player in this industry, we have an inhouse manpower of over 5,000 people and a majority of employees have been associated with us for over two to three decades. We are deeply invested in training and grooming our employees to enable them to elevate their skills with changing technology and remain relevant. As a majority of workers are migrants, retaining them and controlling the quality of training has always been a challenge for the industry. But we have been able to solve it with our people-focused approach. We are proud to say that our workers are 45-60 per cent more proficient than the industry average. These factors enable us to deliver projects timely or even before the deadline, exemplifying our expertise of being the leading partner for developers. We also have a sufficient equipment bank to take up 10 million sq ft of



BCD Emprasa's residential project in Bengaluru features nine modern towers spread over 9 acre.

space without leasing any assets from outside.

In 2022, you launched BCD Emprasa in Bengaluru. Going forward, what are some of your own projects you are working on? Do you have an existing landbank for the same?

We are quite bullish on the sector and have already rolled out a few projects worth over ₹10 million across the residential, commercial and industrial segments. In 2023,

we will be rolling out luxury projects near the international airport that will be designed in Dubai and will have an international-level elevation, design and detail. We are confident this will bring customer delight and are expecting to complete it in record time. This assumes significance as the luxury segment is one of the fastest growing segments and as a trusted name in the industry, we bring in the expertise of offering high-end luxury residential apartments in a cost-effective manner. We also have an existing land bank of 6 million sq ft on our books, which strengthens our position as one of the most financially sound contractors in the industry.

You have been prevalent in Southern India and one of your most recent projects is also based in Chennai. Where else in India would you like to expand your footprint and what kind of projects would you like to execute?

The real-estate market presence, which was largely restricted to the top cities till the last decade, is witnessing a transformation with Tier-II and beyond cities opening up immense opportunities for developers and contractors. This comes on the back of the pandemic democratising white-

FACT FILE

Year of establishment: 1952

Top management: Board of Directors (with over 50 highly trained professional management), headed by Angad Bedi, Managing Director

Segments of operation: Residential (affordable, hi-end residential, bespoke homes, senior living, student living) and commercial (hospitality, schools, IT parks, warehousing)

Areas of operation: Turnkey construction, design and build

Centre of operation: Bengaluru, Karnataka

No. of employees: 600

No. of completed, ongoing and upcoming projects: 500, 35, 25

Turnover: ₹5,000 million

Order book: ₹15,000 million



BCD Emprasa's in Bengaluru is surrounded by 12.5 acre of planned educational, healthcare and commercial development.

collar jobs and the startup ecosystem that is creating employment and entrepreneurship opportunities in smaller cities. We are actively expanding in cities such as Raipur, Pune and Hyderabad while entering new markets such as Kochi in Kerala. These projects span residential, commercial, special economic zones, oil refineries and warehouses. In the next phase of expansion, we are also looking at industrial, hospitals and schools.

As of today, if you had to cite a revenue breakup, how much is driven by domestic clients and international projects?

We have seen a huge jump in revenue after COVID as projects across segments like residential, infrastructure and commercial saw a revival. The residential sector has performed exceptionally well in the past two years and this bull run is expected to continue. Pre-COVID, we had 60 per cent of our business coming from international markets while the remaining 40 per cent was domestic projects. However, after COVID, domestic consumption picked up and we saw 75 per cent of our business from domestic operations while international

business contribution was down to 25 per cent.

How can alternative investment funds (AIFs) play an important role in Indian real estate? Please tell us about India's second largest stress asset fund you have in place for the realty ecosystem.

The collapse of the NBFC sector and the tightening of banking payouts from 2016 to 2021 affected real estate. Lack of liquidity impacted the natural extension of project delivery and increased the timeline. The beginning of 2022 brought some exciting news for the real-estate industry. The market competition to buy a pie of the stressed assets only got better. The market regulator, the Securities and Exchange Board of India (SEBI), classified special situations funds under category 1 of the AIF provisions. AIFs have emerged as a genuine alternate option to traditional lenders such as banks, NBFCs and housing finance companies. Alternate classes of investments bring immediate liquidity faster into the system. AIF along with personal promoter contributors bought immediate liquidity into the system and will be a driver of growth in the real-estate

sector. We have also launched our ₹5 billion AIF along with NISUS Finance and are investing in it.

You have built projects for clients and under Brand BCD. What are some of the challenges faced as a contractor and developer and how can they be addressed?

For contractors, the biggest risk is being dependent on the developer's balance sheet cash flow and profit and loss. Any turmoil with developers will have a ripple effect down to the labour and an instant demobilisation from the site, more than execution risk. As a developer, the biggest risk continues to be land title issues and India's regulatory framework for land wherein insurance of land title, land disputes and the government's authentication of land is implemented. It is a basic need for any execution of a project; there is a dearth of clear title land and even a 1 per cent dispute can hit builders hard.

What kind of a portfolio do you see for yourself between commercial, residential, redevelopment and new age?

Commercial is an asset class we are contracting for third-party companies while for residential we will do turnkey and even build the BCD brand as there is a strong demand from homebuyers. Redevelopment is a decade away before it catches speed apart from Mumbai, which was developed decades back; even Pune is catching up. New age is more for target audiences like HNIs looking for bespoke luxury homes either in a European or Singapore style and will be driven by them. The commercial and residential segment will continue to be a larger pie of our business. For now, we do not see any opportunity in redevelopment.

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Albert(Bengaluru) - 84228 74014, Ganesh(Bengaluru) - 84228 74015, Sanjay(NCR/ Delhi) - 84228 74040,
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Advantage Micro Concrete!

At a time when many buildings are desperately in need of repair and rehabilitation, micro concrete is a viable option for congested and highly reinforced areas as well as wet areas owing to its impervious nature.



Before applying micro concrete, corroded materials and steel bars should be cleaned and coated.

Micro concrete is a coating made of cement that can be applied to a variety of surfaces, such as tile and wood, to replicate the feel and appearance of concrete. It is a well-known strategy for creating surfaces that are pleasing to the eye. The micro concrete that is applied has a thickness of 2 to 3 mm. The material's surface is stain-free, mould-free, anti-slip and hygienic. Hence, it is a great choice for restrooms, kitchens and floor surfaces.

What distinguishes it from standard concrete?

- Ease of handling and placement: Pre-packaged mixes of micro concrete are common, making it simple to prepare and install without skilled labour. As there is no need to prepare the concrete mix onsite, human errors are completely reduced.

As a result, it is an easy surface option for almost any setting that requires a faux concrete finish. Micro concrete is good for people who don't have a lot of space and don't know how to lay concrete.

- Reduced need for water: Micro concrete was initially developed to reduce normal concrete's demand for water. The material is ideal for repairing aged or cracked concrete structures owing to its ability to bond well. Additionally, because it does not require heavy machinery like pumps to be placed, micro concrete reduces the cost of concrete repair.
- Speedy drying: Micro concrete dries quickly and the covered surface can be used in a day or less. Because of this, homeowners and designers who want to decorate the surface of

their homes without disrupting the structure will find it an excellent option.

Application of micro concrete

- Preparation of the surface: The first step in applying micro concrete is to prepare the surface by washing, cleaning and getting rid of dirt, gravel or chemicals. Surfaces made of concrete can be cleaned with water, acids or water blasting. Before applying micro concrete, corroded materials and steel bars should be cleaned and coated.
- Proper mixing: Micro concrete mix can be made by hand but if a lot of it is needed, a mixing vessel should be considered. The proportion of water to micro concrete may vary depending on the mix, but it is typically around 1:8.

Micro concrete is gradually added to water while it is being constantly stirred to prepare a mixture.

- Timely pouring: To achieve the best consistency and flow, the mix should be placed as soon as possible. After that, it is necessary to smoothen out the mixture with the right tools and let it dry.

Uses of micro concrete

Micro concrete has been used for a variety of purposes, including residential and commercial buildings. It has a finish that is long lasting, modern and seamless. Because of its high durability, micro concrete can be used for both outdoor and indoor surfaces like foyers, hotels, shopping centres, open plazas, museums, office centres, garages and other interior surfaces. It is possible to design durable walls and floors using micro concrete. Additionally, because it is watertight, it is suitable for splashbacks in kitchens and bathrooms.

"Micro concrete is used in repair and rehabilitation," says **Shakun Vaidya, VP-CTS, JK Cement**. "This concrete doesn't require any levelling or consolidation and has small size of aggregates; the aggregate size is less than 10 mm and is of great use in congested and highly reinforced areas. It is readily used in jacketing beams and columns. If regular concrete is unable to achieve its desired strength after demoulding, jacketing with micro concrete is a good idea. It is also used in high precision work where thin sections are desired and laying and pumping of concrete are difficult. Micro concrete attains workability at a low water-cement ratio, which makes it impervious



Micro concrete offers quick strength and finish.

to nature. Thus, it is a good option for sea-facing properties. It can be used as an option for blended cement in coastal areas or areas where the rate of corrosion is higher. Having said that, it is a costly proposition for bulk applications. Although micro concrete has its own advantages, the absence of coarse aggregates means it cannot fully replace high-performance concrete. Hence for bulk applications, conventional concrete will find good usage. Especially while building high rises, construction of the beams, columns and slabs may not require micro concrete. Moreover, as one is replacing a bulky material with a finer material, it becomes excessively costly in such cases."

For his part, **Varun Raje, Director, Raje Structural Consultants**, says, "We have used micro concrete for strengthening

buildings. For example, we have used it in strengthening a foundation where we wanted to add two more floors. In this project, the depth of the foundation had to be increased so we used micro concrete. We drilled some holes in the existing footing and poured micro concrete after anchoring it. In high-rise structures or infrastructure projects where a strength of more than 40 mpa is desired, it is essential to design the concrete. Readymade micro concrete cannot be used in such cases. In jacketing, it is used to increase the size of the cross section to enhance the load-carrying capacity of the structure. Micro concrete offers quick strength and finish. Although it is readily used in wet areas for its impervious nature, anti-corrosive paints are a good idea in regions that witness extensive corrosion."

Advantages of micro concrete

- Micro concrete adheres well to any surface and immediately forms a sturdy layer upon application.
- It does not shrink when applied, so there won't be any future cracks.
- Because of its low permeability, it can be used in kitchens and bathrooms as well as outside.
- It does not contain chloride; hence it is safe for use.
- It is extremely long lasting.
- Errors are also eliminated because it comes as a pre-packaged mix and does not require skilled labour or specialised tools.
- It has flowable properties; it doesn't need to be compacted, so heavy machinery is not needed.
- The surface created by applying micro concrete is non-staining, sanitary and anti-slip.

| CW |

CW PROJECT UPDATE

NATIONAL

1,275 railway stations to be upgraded on continuous basis



Indian Railways is undertaking a massive makeover in order to improve infrastructure and enhance the passenger experience. Amrit Bharat

Station Scheme, a new scheme for modernising railway stations, was recently introduced under which a total of 1,275 railway stations, including border areas, have been identified for development. The allocation of funds for the development and maintenance of stations is done Zonal Railway-wise. High-level platforms shall be provided at all categories of stations.

Contact: Indian Railways
Website: www.indianrail.gov.in

PLI brought in ₹450 bn and produced 300,000 jobs

India's production-linked incentive (PLI) programme has attracted investment totalling more than ₹450 billion and produced 300,000



employment opportunities. Results from the PLI initiative are already becoming visible. Incentives of ₹8 billion have already been given. Before March, incentives are anticipated to reach close to ₹30-40 billion. The programme, which aims to make domestic manufacturing competitive on a global scale, was launched with an investment of about ₹2 trillion for as many as 14 industries.

CIL sets aside ₹426 bn for cleaner coal transport

Coal India (CIL) plans to invest around ₹426 billion in low-emission infrastructure for fossil fuel mining and green energy to help India achieve its net-zero targets. CIL plans to invest ₹240 billion in first-mile connectivity projects in three phases. The company also plans to spend about ₹36 billion on 24 railway connectivity projects. It plans to increase its renewable capacity to 3 GW, which would entail a cumulative investment of about ₹150 billion by 2024.

Contact: Coal India (CIL)
Tel: 033-2324 5555
Website: www.coalindia.in

ANDAMAN & NICOBAR

Eols invited for ₹410 billion transshipment port

The Ministry of Ports, Shipping and Waterways has invited expressions of interest (Eol) from interested players for a ₹410 billion international transshipment port project at Great Nicobar Island. It will receive investment from both government and the PPP concessionaire. The proposed port will have the ultimate capacity to handle 16 million containers per year and in the first phase will handle 4 million containers. Other projects planned around the port include an airport, township and power plant.

Contact: Ministry of Ports, Shipping and Waterways
Website: shipmin.gov.in

ANDHRA PRADESH

State allocated ₹84.06 billion in railway budget



A staggering ₹84.06 billion allocation was made for the Railways of Andhra Pradesh in the Union Budget. This was against the ₹70.32 billion in 2022-23, a rise of 20 per cent. A total of 72 stations in Andhra Pradesh were taken up to be developed as world-class stations. The Vande Bharat Rail also has been a success and the occupancy rate was almost 120 per cent on the train that runs between Visakhapatnam and Secunderabad.

GUJARAT

State to receive ₹126 bn for roads, bridges, logistic parks

Nitin Gadkari, Union Minister for Road Transport and Highways, has stated that Gujarat will receive an additional ₹126 billion from the Central Government for the building of roads, bridges, and logistic parks in the state. This fund will include ₹60 billion for the creation of multimodal logistics parks and ₹10 billion for the building of Road Over Bridges or Road Under Bridges on roads other than national highways. By January 2024, he expects the Ahmedabad-Dholera Expressway to be completed.

Contact: Ministry of Road Transport and Highways

Website: morth.nic.in

KARNATAKA

NHAI begins working on the final stretch of Bengaluru-Mysuru Expressway

The NHAI has taken over the construction of the final mile of the Bengaluru-Mysuru Expressway on the Mysuru side. The expressway would cut commute time by 90 minutes. Since the completion of the 7 km Srirangapatna bypass, the majority of the expressway is now accessible to motor vehicles. Work is moving quickly in order to meet the deadline. A few minor tasks pertaining to the bridge that had been pending completion will soon be completed.

Contact: National Highways Authority of India (NHAI)

Tel: 011-2507 4100

Website: www.nhai.gov.in

JAMMU & KASHMIR

Road, tunnel infra receives push in the past two years

The union territory administration is ensuring the construction of a 20 km road length and the macadamisation of a 15 km road stretch every single day. Besides, 100 bridges are under construction to put an end to frequent traffic congestion and ensure smooth vehicular movement. The initiative is in line with the vision of the government to provide all urban facilities in rural areas by 2023. The state has also set a new record of constructing 6,450 km of road length.



JHARKHAND

CIL subsidiary tenders 1.02 MW of solar power projects

Coal India subsidiary, Central Mine Planning and Design Institute, has launched a tender for the installation and commissioning of 1.02 MW of grid-connected PV power plants in Jharkhand. The projects will include 860 kW of rooftop solar systems, as well as a 160 kW ground-mounted solar project. According to CMPDI, the deadline for submitting bids is March 4, 2023. The bids will be opened on March 6, 2023.



Contact: Coal India (CIL)

Tel: 033-2324 5555

Website: www.coalindia.in

MAHARASHTRA

MMRDA nod to study on coastal road in Thane

To enable the smooth flow of vehicles coming from Samruddhi Mahamarg, Mumbai Nashik Expressway, Kalyan and other areas, the MMRDA has commissioned a study to build a coastal road in Thane.

An expression of interest has been issued for the study. The Thane coastal road will have six lanes and will connect Bhiwandi bypass.

Contact: MMRDA

Tel: 022-2659 4000

Website: mmrda.maharashtra.gov.in



RAJASTHAN

State to have 13 new industrial areas

To boost the industrial infrastructure in the state, the Rajasthan State Industrial Development and Investment Corporation (RIICO) will build roughly 13 new industrial parks along the Mehsana-Bathinda gas pipeline route. Furnace-based companies, which need affordable fuel for manufacturing, will be concentrated in these areas. The

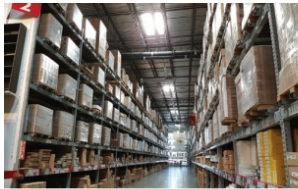
furnaces, ovens, boilers, turbines, and heaters will all be fueled by the gas pipeline. In addition to creating new job opportunities in the state, the current and upcoming industrial sectors by the RIICO would also increase the state's revenue.

Contact: Rajasthan State Industrial Development and Investment Corporation
Website: industries.rajasthan.gov.in/riico



UTTAR PRADESH

Welspun One to invest ₹20 billion in the state



Welspun One Logistics Parks has signed an MoU with the Government of Uttar Pradesh to broaden its presence in the warehousing sector in North India. The MoU was signed at the UP Global Investors Summit 2023. The company

will utilise government and private land parcels in Lucknow for the construction of Grade A warehouse facilities and logistics parks. It will invest ₹20 billion for 6 million sq ft and will be built over three to four years and generate 6,000 jobs.

Contact: Welspun One Logistics Parks
Tel: 022-6613 6000
Website: www.welspunone.com

UTTARAKHAND

State establishes sewage treatment plant in Haldwani

A sewage treatment facility worth ₹353.8 million was officially opened by Uttarakhand Chief Minister Pushkar Singh Dhami, who hailed it as a significant step towards cleanliness. The quality of water of the Ganga has become "A-Grade" up to Rishikesh and the goal now is to make it A-Grade up to Haridwar, the chief minister reportedly said. Additionally, he declared that funding will be provided in the state budget for Haldwani to build an international-grade zoo.



INTERNATIONAL

Acme partners with Norfund to invest in renewable energy projects

The Norwegian investment fund, Norfund and the Indian Acme Group have partnered to invest in the creation of brand-new, greenfield renewable energy projects in India. A framework agreement for co-investment was agreed upon by both partners. The Norwegian Government owns the Norwegian Investment Fund for Developing Countries, which largely invests in the clean energy industry. One of India's top developers of renewable energy, ACME Group has projects in 12 states.

Contact: Acme Group
Website: www.acme.in

RITES invites EPC partners for metro railway projects

Railway consultancy firm RITES is looking for partners for the construction of metro projects in India and abroad. RITES has invited Expressions of Interest (EoI) from Indian EPC firms for the empanelment of contractors. The EoI has been invited for three categories of metro projects of up to ₹5 billion, ₹7.5 billion and ₹10 billion.

Contact: RITES
Tel: 012-4257 1666
Website: www.rites.com



POWER UPDATE

Delhi to raise power generation capacity by 6,000 MW



The Delhi administration would boost the city's capacity for power generation by 6,000 MW over the course of the next three years using renewable energy sources. A generation-based incentive (GBI) of ₹2-3 per unit of power for residential customers and ₹1 for commercial customers is proposed in the Delhi

Government's new solar policy, which will incentivise residents of Delhi to install solar panels on their rooftops. A subsidy of ₹2,000 per kilowatt per consumer, up to a maximum of ₹10,000, is also included in the scheme.

Contact: Government of Delhi
Website: portal.delhi.gov.in

NTPC invites bids for BoS for 1 GW solar projects



NTPC Renewable Energy has invited bids for a balance of system (BoS) package with land for interstate transmission system (ISTS)-connected solar projects of up to 1,000 MW anywhere in India except Rajasthan, with a greenshoe option for an additional 500 MW. The winning bidder will also be responsible for the operation and maintenance of the systems for three years. The deadline for bid submissions is March 21, 2023.

Contact: NTPC Renewable Energy
Tel: 011-2436 0100
E-mail: ntpccc@ntpc.co.in
Website: www.ntpc.co.in

CESC invites bids for wind-solar hybrid projects



CESC has invited bids to set up 150 MW of the interstate transmission system (ISTS) connected wind-solar hybrid power projects. The last date to submit the bids is March 20, 2023. Bids will be opened the following day. The project must be commissioned within 24 months from the effective date of the PPA. The PPAs will be valid for 25 years. The developer will be acquiring the land required to set up the project.

Contact: CESC
Tel: 033-2225 6040
E-mail: cesclimited@rpsg.in
Website: www.cesc.co.in

₹350 billion allotted towards energy transition

India's target of achieving net zero carbon emissions by 2070 will require a priority capital investment of ₹350 billion, Finance Minister Nirmala Sitharaman has reportedly stated. In order to minimise carbon intensity and the usage of fossil fuels, she has also pledged an additional ₹197 billion for the government's Green Hydrogen Mission. She has declared a 5 million tonne goal and a ₹197 billion investment for producing renewable hydrogen by 2030. The mission's goals are to make India an energy-independent nation and to decarbonise key industries.

KEC International wins new orders of ₹11.31 billion

KEC International has secured new orders of ₹11.31 billion across its various businesses. Of these, the business has secured orders for T&D projects in India, Africa and the Americas. These comprise a composite package including 220 kV and 132 kV GIS and AIS substation, transmission line, and underground cabling. The order also includes a 330 kV electrical transformer station project in Africa and a supply of towers in the USA. The company's subsidiary, SAE Towers, has also secured a large tower supply order in Mexico.

Contact: KEC International
Tel: 022-6667 0200
E-mail: kecindia@kecrpg.com
Website: www.kecrpg.com

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AIRPORTS



Hubballi airport to upgrade to international airport

Hubballi Airport will be upgraded to an international airport shortly, with the current runway being extended by 600 m to accommodate larger aircraft landings and the construction of a new terminal building. Once

the proposed new terminal is completed, the passenger handling area will be significantly enlarged from the current 3,700 sq m. It will also include three aero bridges with a total area of 20,000 sq m and a capacity of 1,400 passengers, as well as all current facilities and equipment, and will function entirely on solar power.

Contact: Hubballi Airport
Website: www.aai.aero



Phase 2 land acquisition for Jewar Airport to begin soon

The district government is to finish the survey for the land acquisition for phase 2 of the Noida international green field airport in Jewar. A total of 1,365 hectare are designated for the airport's second phase. The project's first phase, which will consist of a terminal building covering a total area of 100,000 sq m, is now under construction. According to a preliminary survey of the region, 7,164 farmers must get compensated at a rate of ₹3,400 per sq m in order to recover.

Contact: Noida International Airport
Website: niairport.in



Number of airports in the country to go up



In order to increase the depth of air penetration, the Civil Aviation Ministry plans to increase the number of airports operating in the nation to over 200 over the next five to six years. New airports created in the nation has climbed to 147 from 74 in the previous eight and a half years. The Ministry plans to increase the number of airports to over 200 in the next five to six years.

Contact: Ministry of Civil Aviation
Website: www.civilaviation.gov.in



Gujarat's new greenfield airport completes 95% of earthwork



AAI has begun work on the construction of a new greenfield airport in Gujarat. The new airport is 30 km from Rajkot and will cost ₹14.05 billion. More than 95 per cent of the earthwork has been completed. The airport, which spans 1,025 hectare, is being built with cutting-edge technology to improve the passenger experience. The airport will be operational by December 2023.

Contact: Airports Authority of India
Website: www.aai.aero



Government to develop 100 airports by 2024 to support UDAN

Under the Scheme, 459 UDAN routes involving 72 airports including nine heliports and two water aerodromes have been operationalised, across the country. The government has planned to develop 100 airports by 2024 to support the UDAN scheme and operationalise 1,000 UDAN routes. Eighteen airports have been identified in Uttar Pradesh and six in Rajasthan and Odisha. Nine heliports have been developed and operationalised in Himachal Pradesh and Uttarakhand.

Contact: Airports Authority of India
Website: www.aai.aero

PORTS



DP World wins bid for India's Deendayal Port

A significant concession has been awarded to DP World to build, run, and maintain the mega-container terminal at Tuna Tekra in Gujarat's Deendayal port. The terminal, when finished, will have a 1,100 m berth and be able to handle ships carrying more than 18,000 TEUs. Once finished, the terminal will support imports and exports from Northern, Western, and Central India, lowering transportation costs, and improving supply chain efficiencies. This will boost India's future container traffic growth.

Contact: DP World
Website: www.dpworld.com



MIV 2030 estimates ₹1-1.25 trillion for capacity augmentation

To develop global standard ports in India, Maritime India Vision (MIV) 2030 has identified initiatives such as developing world-class mega ports, transshipment hubs and infrastructure modernization of ports. It estimates investments to the tune of ₹1-1.25 trillion for capacity augmentation and development of world-class infrastructure at Indian Ports. The upcoming ports at Vizhinjam (Kerala) and Vadhavan (Maharashtra) have natural drafts in excess of 18 m that would enable ultra-large container and cargo vessels to call on the ports.



Dredging Corporation signs agreement for waterways work

Dredging Corporation of India (DCI) has signed an agreement with the Inland Waterways Authority of India for the development and maintenance of a fairway on national waterways in the North Eastern region estimated to cost ₹2.04 billion. The scope of work includes the development and maintenance of a fairway width of 32 m and depth of 2-2.5 m for 3 years on national waterways in the North Eastern region by undertaking dredging, channel marking, and river training to ensure safe navigation of vessels.

Contact: Dredging Corporation of India
Tel: 089-1252 3250
E-mail: hodci@dcil.co.in



Hapag-Lloyd AG acquires 35% stake in JM Baxi Ports

A 35 per cent stake in JM Baxi Ports & Logistics was acquired by German shipping giant Hapag-Lloyd AG from the current shareholder Bain Capital Private Equity. In addition, Hapag-Lloyd AG and JMBPL have entered into a legally binding agreement to subscribe to a capital increase and raise Hapag-Lloyd's stake in the company to 40 per cent. The deal's value has been estimated at roughly \$350 million.

Contact: Hapag-Lloyd AG
Website: www.hapag-lloyd.com



Visakhapatnam Port Authority set to become landlord port

With the NITI Aayog unveiling National Monetisation Pipeline (NMP) to unlock value in brownfield projects by engaging the private sector, Visakhapatnam Port Authority (VPA) has launched a massive exercise to award management of berths under PPP mode. VPA has already entrusted the job of building and managing container berths and other facilities to private investors.



Contact: Visakhapatnam Port Authority
Mob: (0)89128 76000
E-mail: e-reg.vpt@gov.in
Website: vizagport.com

RAILWAYS



Official shares progress report on bullet train project

Construction work for Indian Railways' ambitious Mumbai-Ahmedabad high-speed rail project is on at full speed. Project Manager UP Singh reportedly stated that construction work is underway at Vikhroli. Six platforms will be built around



24 m below ground level. Stations have three levels including station facilities, passenger amenities and a platform on each level. Two bids have been received from Afcons Infrastructure and Larsen & Toubro for the C-2 package between Bandra-Kurla Complex in Mumbai and Shilphata in Thane district.

Contact: Indian Railways
Website: www.indianrail.gov.in



Kochi Metro second phase work back on track

With the Kerala Infrastructure Investment Fund Board (KIIFB) giving funds for land purchase, the foundation for Kochi Metro Rail's Phase 2 has advanced. Due to ongoing road widening projects, considerable preparation work was stalled for two to three months. The land purchase along the length from Palarivattom to Infopark has been completed to almost 90 per cent. Within six months, the remaining work will be finished. The nine metro stations in Phase 2 would need the construction of about 1.714 hectare.

Contact: Kochi Metro Rail
Tel: 048-4284 6700
Website: kochimetro.org



UP receives biggest share of fund for railway modernisation



Of the ₹2,400 billion allotted to the Railways in the Union Budget for 2023-24, Uttar Pradesh has received ₹175.7 billion. In 2013-14, Railways contributed ₹281.74 billion of the total. Following this, ₹1,591 billion was received in 2022-23, and as of right now, ₹2,400 billion has been received for this fiscal year (2023-24). This is roughly a nine-fold rise from 2013-14 and a 51 per cent increase from 2022-23, according to Railways.



Agra metro expected to be operational by early 2024

Yogi Adityanath, Chief Minister of Uttar Pradesh, has reportedly announced that the Agra metro will be operational by the beginning of 2024. The priority corridor of 6 km would be completed six months ahead of the scheduled target and Metro services will be operational by the beginning of 2024. Along with three underground metro stations, it would also contain three elevated metro stations. Prime Minister Narendra Modi virtually laid the groundwork for the metro in 2020.

Contact: Uttar Pradesh Metro Rail Corporation
Tel: 052-2230 4014
Website: www.lmrc.com



Jharkhand receives ₹52.71 bn to improve rail infra

Jharkhand has been given a staggering ₹52.71 billion from the Union Budget to improve the state's railway infrastructure. The state now receives an average yearly budget expenditure that is approximately 11 times greater than what it did between 2009 and 2014. Up to 57 stations in the state will be renovated and upgraded to world-class stations. Amrit Bharat Station programme would be used to develop the other stations into model stations while Ranchi and Hatia will undergo a thorough makeover.

Contact: Indian Railways
Website: www.indianrail.gov.in

ROADWAYS

PM dedicates Delhi–Dausa–Lalsot section of Delhi Mumbai Expressway to nation

Prime Minister Narendra Modi has dedicated the 246 km Delhi-Dausa-Lalsot section of the Delhi Mumbai Expressway to the nation and underlined this as one of the most advanced expressways in the world. Highlighting that the Delhi-Mumbai Expressway is powered by the PM Gati Shakti Masterplan, Modi informed that arrangements have been made to lay optical fibre, electricity lines and gas pipelines, and the leftover land will be used for producing solar energy as well as warehousing purposes.



Funding for NH projects in Karnataka announced

Nitin Gadkari, the Union Minister of Road Transport and Highways, has reportedly announced grants for a number of national highway projects in Karnataka. He has approved the EPC model for widening the two lanes of the Kanamadi-Bijjaragi-Tikota section of NH-166E (the border between Maharashtra and Karnataka) using ₹1.96 billion. A budget of ₹3.33 billion was also approved for the construction of an EPC-based NH(O) bypass at Kukunoor, Yelburga, Gajendragad of the Bhanapur Gaddanakeri section of NH-367 in the Koppal district.

NHSRCL opens tender for 21 km tunnel between BKC and Thane



With 39,570 sq m of land now available for the Mumbai-Ahmedabad bullet train project at Vikhroli, the National High-Speed Rail Corporation (NHSRCL) has opened tenders for the 21 km tunnel between Bandra Kurla Complex (BKC) and Thane. The tunnel is estimated to cost around ₹100 billion. The NHSRCL has now obtained 99 per cent of land for the high-speed rail corridor.

Contact: National High-Speed Rail Corporation
Website: nhsrcl.in

NHAI floats e-tender for Outer Ring Road project

The development of the proposed Outer Ring Road in Thiruvananthapuram is a step closer to reality with the NHAI floating an e-tender for the project. The NHAI has divided the tender into two reaches – the first, a 29 km stretch from Navaikulam to Thekkada, and the second, a 33.4 km stretch from Thekkada to Vizhinjam. The total expected cost of the Navaikulam-Thekkada road is ₹14.78 billion, and for the Thekkada-Vizhinjam stretch, ₹14.89 billion. The e-tender has been uploaded to the NHAI website, and the last date for bidding is March 16. A total of 348.09 hectare of land will be acquired for the project.

Contact: National Highways Authority of India (NHAI)
Tel: 011-2507 4100
Website: www.nhai.gov.in

NHIDCL issues a bid for road modernisation in Assam



The National Highways & Infrastructure Development Corporation has launched a tender for the EPC mode widening of Assam's Simen Chapori to Nagabang Gamsuk and Tamenglong to Mahur section roads. The road will be widened to four lanes with a paved shoulder. It will cost ₹4.20 billion, and it will take 30 months to build. The deadline to submit bids for both is March 13, 2023.

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Arkade Group buys ₹1.03 million plot from Bajaj group firm

For ₹1.03 million, Arkade Group has purchased 8,300 sq m land in eastern Mumbai from Hercules Hoists, a subsidiary of the Bajaj Group. As reported, Arkade will construct a residential complex with the potential to grow to 0.5 million sq ft and include 2 and 3 BHKs. The project has a topline potential of \$600 million. This acquisition is in addition to the 2 million sq ft of ongoing construction that is



taking place throughout the city's western suburbs.

Contact: Arkade Group
Tel: (0)92228 92229
Website: arkade.in



Ivanhoe Cambridge, Mapletree launch \$1.9 bn India office venture

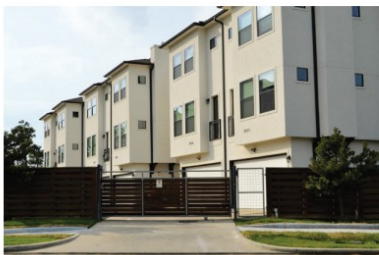
Canada's Ivanhoe Cambridge has announced a partnership with Singapore's Mapletree Investments to develop, acquire and operate workplaces for India's tech sector. The new venture will have an investment capacity of over \$1.86 billion. Properties and projects have already been identified to realise

that vision, which aims to profit from sustainable assets. This latest announcement follows earlier investments in India including a \$500 million office platform with local developer Embassy Group.

Contact: Ivanhoe Cambridge
Tel: 022-6813 3580
Website: www.ivanhoecambridge.com



Godrej Properties launches Phase-2 of plotted development in Haryana



Godrej Properties has launched Phase-2 of its plotted development, Godrej Green Estate. Spread across 50 acre, the project includes

five blocks consisting of spacious residential plots. The project offers Lutyens-style gardens and green surroundings. Additionally, it offers sustainable integrated facilities such as rainwater harvesting systems, solar panels, and other green initiatives designed around reducing carbon footprint, which provides a healthy living environment for residents.

Contact: Godrej Properties
Website: godrejproperties.com



TriVeda Capital investment fund to raise ₹2 bn

TriVeda Capital has launched its new-age Indian real estate investment platform, a SEBI-registered Alternative Investment Fund (AIF), and plans to raise a ₹2 billion AIF corpus to invest in plotted development projects. It will be offering Indian and offshore investors an opportunity to participate in the long-term Indian real estate growth story. The company's investment strategy is focused on high-demand residential real estate assets, risk-mitigated execution, and downside-protected deal structures.

Contact: TriVeda Capital
Tel: 080-4433 4445
Email: compliance@trivedacapital.com
Website: www.trivedacapital.com



DLF to launch premium project in Gurugram

DLF plans to launch a luxury housing project in Gurugram with an estimated sales revenue of around ₹75 billion as it seeks to tap strong demand for high-end apartments. The company plans to develop around 1,100 apartments in this residential project. It achieved a 45 per cent growth in sales bookings to ₹65.99 billion in the April-December period of this fiscal and is on track to achieve its annual sales guidance of ₹80 billion. DLF's sales bookings stood at ₹45.44 billion in the year-ago period.

SMART CITIES UPDATE



22 cities under the Smart City Mission to be ready by March end



With a promise of a better quality of life and a clean, sustainable environment, 22 cities will complete all projects under the government's flagship Smart City Mission by March-end. Projects in

the remaining 78 cities selected under the mission will be completed in the next three to four months. The 22 cities, which will be completed by March, include Bhopal, Indore, Agra, Varanasi, Bhubaneswar, Chennai, Coimbatore, Erode, Ranchi, Salem, Surat, Udaipur, Visakhapatnam, Ahmedabad, Kakinada, Pune, Vellore, Pimpri-Chinchwad, Madurai, Amaravati, Tiruchirappalli, and Thanjavur.

Contact: Smart Cities Mission
Website: smartcities.gov.in



Gift City would embody the Aatmanirbhar project: Survey



Gift City would not only be an instrument for capital flows, but also make a 'quantum leap' that would embody the government's Aatmanirbhar project, stated the recent economic survey. The Centre has an outlay of ₹8 billion for the facility. The survey adds that setting up and operationalising India's maiden International Financial Service Centre (IFSC) in GIFT City has been a financial reform underpinning India's liberal outlook towards capital account convertibility.

Contact: GIFT City
Tel: 079-6170 8300
E-mail: query@giftgujarat.in
Website: www.giftgujarat.in



MC to take overall pending Ludhiana Smart City projects



Due to the paucity of time, more than a dozen projects proposed that were initially carried out by the Ludhiana Smart City (LSCL) will now be completed by the Municipal Corporation (MC). Since LSCL cannot start fresh projects, funding will be done by the Smart City Mission, but the civic body will execute the work. However, there would be no major difference as only the execution agency will be changed. In order to ensure that funding would be utilised judiciously, the MC and LSCL signed an MoU, and projects were handed over to the MC as deposit works.

Contact: Ludhiana Smart City
Tel: 016-1291 7005
E-mail: commissionerml@gmail.com
Website: mcludhiana.gov.in



Madhya Pradesh proposes two greenfield smart cities

Madhya Pradesh Government has sent a proposal to the centre regarding the selection of Pithampur Sector 7 and Jabalpur textile and logistic cluster, under the Greenfield Smart City project. The state government is optimistic about getting a ₹10 billion grant for the project.

Approximately 50 hectare of land is available at both locations. This would offer an idea of the current development status and the proposed work needed for industrial townships, environmental protection, employment, economic growth and other aspects of the living index.



Indore civic body introduces bonds to raise funds for solar power plant

Green bonds worth ₹2.44 billion issued by the Indore Municipal Corporation to build a solar power plant were unexpectedly oversubscribed to ₹6.61 billion on the first day of issuance. The bond was issued to mobilise funds to set up a 60 MW solar power plant in Jalud village in the neighbouring Khargone district that will be used to draw water from the Narmada river and supply it to Indore.

Contact: Indore Smart City
Tel: 073-1253 5572
E-mail: info@smartcityindore.org
Website: www.smartcityindore.org

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Asphalt line launched by Sany Bharat

Sany Bharat launched its asphalt business at bauma CONEXPO 2023. The company's asphalt machine range with powerful engines and reliable components is poised to be an ideal solution in various work environments and road construction. The company has established a large network for after-sales support for its existing products, and the brand plans to leverage this strength for the asphalt business line too. The newly launched machines are



now available for end customers in the road construction industry in India and South Asia.

Contact: Sany Bharat
Tel: 021-3567 0288
E-mail: corporate@sany.in
Website: www.sany.in



BharatBenz launches new trucks at bauma CONEXPO

Daimler India Commercial Vehicles has strengthened its product offerings for the construction and mining sector with the BharatBenz 3532CM mining tipper, 2832CM mining tipper and 5532 tip trailer. The entire truck model range was on display at bauma CONEXPO India. The new model range comes with a 320 HP BSVI diesel powertrain, providing high wheel-end torque required to negotiate tough, gradient mining roads. The vehicles come with industry-leading body capacities, benefiting customers in the mining sector.

Contact: Daimler India Commercial Vehicles
Tel: 044-4599 6583
Website: www.bharatbenz.com



ACE unveils India's first electric mobile crane



India's first indigenously developed fully electric mobile crane has been launched by ACE at bauma CONEXPO 2023. ACE F150-ev 4X4 has been specifically designed to suit both road travel and pick-n-carry use. The electric crane delivers optimum power and productivity while maintaining the versatility for Indian conditions. With a 4-wheel drive, it is suitable for rough terrain operations and is equipped with unparalleled safety features with durability and stability.

Contact: Action Construction Equipment
Tel: 012-7528 0111
Website: www.ace-cranes.com



BKT launches EARTHMAX Crusher Haul and EARTHMAX SR 34



Balkrishna Industries (BKT) has launched two 'Made for India' tires under the sub-brand EARTHMAX, namely the EARTHMAX Crusher Haul and EARTHMAX SR 34. The tires were displayed at bauma CONEXPO India. The Crusher Haul is designed for on and off-road quarry and haulage applications. Part of the same range, EARTHMAX SR 34 is an all-steel radial tire designed for mining applications. The 'non-directional block' tread pattern provides excellent traction and stability on any type of terrain.

Contact: Balkrishna Industries
Website: www.bkt-tires.com



JK Tyre launches three new tyres for the off-road segment

Three new off-the-road tyres (OTR) have been introduced by JK Tyre during bauma CONEXPO 2023. The new range includes products for the Indian and international markets. The 26.5-25 Loader Champ 28PR E4/L4 TL is a heavy-duty product made for articulated dumpers and wheel loaders. For the international markets, two new skid steer loader tyre varieties are planned; the 23X8.50-12 JET TRAX ULTIMA and the 23X5.7-12 JET TRAX SUPER II. They are intended for use in 'Non-Highway Services (NHS).'

Contact: JK Tyre
Tel: 011-6600 1112
Website: www.jktyre.com



SDLG India showcases hydraulic excavator and wheel loader at bauma 2023

SDLG India displayed the E6135Fi Hydraulic Excavator and L933H Wheel Loader at bauma. The E6135i Excavator is a 13 tonne machine designed and built for heavy lifting. It features a powerful four-cylinder DDE engine coupled with an energy-saving, load-sensing hydraulic system and delivers best-in-class performance. The L933H Wheel Loader is a feature-packed machine widely preferred at construction sites and aggregate plants, and for bulk material operations. It is powered



by an advanced CEV-IV engine and a fully-hydraulic load-sensing steering system assuring remarkable flexibility and ease of operations.

Contact: SDLG India
Website: www.volvoce.com/india



Caterpillar showcases products, technologies and services at bauma

Caterpillar showcased its world-class products equipped with advanced technology and digitally-enabled service solutions at bauma CONEXPO INDIA. From connected assets to online parts ordering, and data analytics to automation, the Caterpillar exhibit featured a technology ecosystem to help customers get the most from their machines. The exhibit also had a wide range of products including hydraulic excavators, wheel loaders, backhoe loaders, skid steer loaders, attachments and generator sets from Caterpillar, SEM, Hindustan and FG Wilson brands.

Contact: Caterpillar
Website: www.caterpillar.com



Schwing Stetter India launches 14 new products at bauma CONEXPO



Schwing Stetter India unveiled 14 new products at the Bauma CONEXPO India 2023. During the four-day event, a range of new products were launched at the outdoor stall, including a shotcrete pump (from R&D) - TSR 30.14 (EV), cylinder finisher - CF450 XXV, belt conveyor - 40 m and more. Powered by this new line-up, the company aims to increase its growth and showcase high-tech leadership in concreting and construction equipment manufacturing.

Contact: Schwing Stetter India
Tel: 044-7137 8100
E-mail: chennai@schwingstetterindia.com
Website: www.schwingstetterindia.com



Komatsu India launches bio-diesel compatible off-highway trucks



In a significant breakthrough during FY2022-23, Komatsu India has rolled out bio-diesel compatible off-highway trucks from its manufacturing facility in Oragadam near Chennai. The company has developed diesel-powered machines that are compatible with B20 fuel including excavators, bulldozers, wheel loaders, motor graders, dump trucks, and more. It also offers electric and hybrid construction equipment which emit fewer greenhouse gas emissions than traditional equipment.

Contact: Komatsu India
Website: www.komatsuindia.in



Terex India showcases eight latest offerings at bauma 2023

Terex India showcased eight of its latest products to cater to the crushing, screening, lifting, washing and recycling industries and coupled these products' launches with key handovers. The highlight was the launch of the electric-driven Finlay 690i Hybrid Mobile Screen, in the presence of Nitin Gadkari, Minister of Road Transport & Highways. The Finlay 690i mobile inclined screen has opened doors to low emission screening on multiple applications such as quarrying, mining, sand and gravel, and recycling.

Contact: Terex India
Tel: 080-3315 1000
Website: www.terex.com

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India Cements to refurbish old cement plants costing ₹16 bn



India Cements has drawn up plans to refurbish its old manufacturing facilities at an estimated outlay of ₹15 to ₹16 billion. The funds to undertake the refurbishment would

be met through internal accruals and the firm has roped in Polysius and FL Smidth, two international consultants, to make the plants more efficient. The 'refurbishment programme' is estimated to take 15-18 months to complete. The company has a vast land of 26,000 acre and the funds would be raised by monetising the land bank.

Contact: India Cements
Tel: 044-2852 1526
E-mail: corporate@indiacement.com
Website: www.indiacement.com



UltraTech Cement commissions cement grinding unit in Odisha



UltraTech Cement has commissioned a 1.5 mtpa brownfield cement grinding unit at Jharsuguda, Odisha. This takes the company's total cement capacity in the state to 4.1 mtpa. This forms part of the ongoing capacity expansion. The company's wholly-owned subsidiary has recently entered into a share sale and purchase agreement with Seven Seas Company, Oman for 70 per cent equity shares in Duqm Cement Project International.

Contact: UltraTech Cement
Tel: 022-6691 7800
E-mail: ultratech.communication@adityabirla.com
Website: www.ultratechcement.com



JK Lakshmi manufacturing facility to be one of the greenest units in cement industry



As part of its "Green Pahal, Behtar Kal" campaign, JK Lakshmi Cement has signed an agreement with Amplus Solar to set up a 56 MW solar power plant for its Durg facility, located in Chhattisgarh. The company has always been at the forefront and has been working towards reducing its carbon footprint. With this initiative, the company will be able to replace 92 million units with green electricity, which will help reduce its CO2 emissions by 73,000 metric tonne.

Contact: JK Lakshmi Cement
Tel: 011-6600 1112
Website: www.jklakshmicement.com



Government to look into plea to cut GST

Finance minister Nirmala Sitharaman has reportedly said that suggestions for lowering the 28 per cent GST on cement will be looked into as a step towards easing construction costs. Reportedly, the industry suggested lowering GST on cement so that it could help both government infrastructure projects as well as projects by the private sector and by individuals. This comes at a time when the Central Government has scaled up its capital expenditure from ₹7.28 trillion in FY23 to ₹10 trillion in FY24 in the Union Budget presented on February 1.



Operating margins of cement to increase by 200-240 bps in FY24: ICRA

The revenues of cement companies are estimated to increase by 12-14 per cent in FY2023, supported by volumetric growth as well as higher realisations. However, the elevated input costs, primarily power and fuel, raw material and freight charges, are likely to exert pressure on OPBIDTA. Consequently, the operating margins of cement companies are estimated to contract by 600-690 bps to ~13.9-14.8 per cent in FY2023. However, driven by the expected easing of the cost side pressures, primarily on power and fuel costs, the operating margins are likely to increase by 200-240 bps in FY2024.

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UPCOMING PROJECTS

SL No.	COMPANY	PROJECT DETAILS	BUDGET (IN ₹MILLION)	CONTACTS	TYPE
INFRASTRUCTURE					
1	JSW Group	The JSW Group is committed to investing in Odisha across various sectors, including for a mega greenfield steel plant project in Paradip.	1,000,000	Jayant Acharya, Director (Commercial & Marketing) / Lancy Varghese, Company Secretary, Bandra Kurla Complex, Near MMRDA Grounds, Bandra East, Mumbai-400051, Maharashtra. T: 022-42861000, F: 022-42863000, jayant.acharya@jsw.in, lancy.varghese@jsw.in	Under Implementation
2	Essar Group	Essar Group plans to set up a petrochemical complex in Odisha in a tie-up with a global player. The oil to petrochemical complex will have an annual capacity of 7.5 million tonne.	400,000	Manish Kedia, Senior Vice President, Corporate Affairs, Essar, Essar House, 11, Keshavrao Khadye Marg, Mahalaxmi, Mumbai-400034, Maharashtra. T: 022-66601100, F: 66601809, M: 9819730092, manish.kedia@essar.com	Conceptual
3	Amara Raja Batteries	Amara Raja Batteries intends to invest over the next 10 years in Telangana on setting up research and manufacturing facilities for lithium-ion battery-making in the state.	95,000	Terminal A, 1-18/1/AMR/NR, Nanakramguda, Gachibowli, Hyderabad-500032, Telangana. T: 040-23139000, F: 040-23139001	Conceptual
4	Public Works Department, Government of Uttar Pradesh	Yogi Adityanath, Chief Minister, Uttar Pradesh, has inaugurated 35 projects and laid the foundation stone of 249 projects worth ₹9.69 billion in Prayagraj.	3,252	Sanjay Kumar Srivastava, Chief Engineer, Lucknow-226001, Uttar Pradesh, T: 0522-2236496 (Manoj Kumar Gupta, Engineer in chief, pwdeinc@gmail.com / Arvind Kumar Srivastava, Engineer in chief, encrrlko@gmail.com)	Conceptual
5	Government of Madhya Pradesh	Many big development projects are going to take shape in Ratlam city. Along with the progress of the construction works of Transport Nagar, Gold Complex, the construction work of the auditorium is also beginning.	1,000	Mukesh Chand Gupta, Commissioner, Technical Education, Skill Development and Employment Department, Vallabh Bhavan, Mantralaya, Bhopal- 462004, Madhya Pradesh. T: 0755-2708350, ctemp.bpl@mp.gov.in	Under Implementation
METRO					
6	Mumbai Metro Rail Corporation (MMRCL)	The first and only underground metro network in Mumbai, Line-3, also known as the Bandra-Colaba-SEEPZ Line, is now 76.6 per cent complete, according to the Mumbai Metro Rail Corporation.	380,000	SK Gupta, Director (Projects), Transit Office 'E'-Block, North side of City Park, Behind Income Tax Office 'A' Wing Bandra (E) BKC, Mumbai - 400051, Maharashtra. T: 022-26384638, F: 022-26592005, www.mmrcl.com	Under Implementation

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AMMANN

UPCOMING PROJECTS

SL No.	COMPANY	PROJECT DETAILS	BUDGET (IN ₹MILLION)	CONTACTS	TYPE
7	Bangalore Metro Rail Corporation (BMRC)	The Karnataka Government has given prior permission to the Namma Metro Phase III plan in Bangalore.	164,300	Prashantha DR, AGM HR (PIO)/ D Radhakrishna Reddy, Director (Project & Planning), III Floor, BMTC Complex, K.H.Road, Shanthinagar, Bangalore 560027, Karnataka. T: 080-22969200, 22969300, 22969301, 22969206, 22969231, travelhelp@bmrc.co.in, www.bmrc.co.in	Under Implementation
8	Hyderabad Metro Rail (HMRL)	Foundation stone laid for a 31 km long airport metro rail corridor in Hyderabad on 9th December. This 31 km long metro rail line would connect the IT hub in the western Hyderabad and the airport located in southern Hyderabad.	62,500	NVS Reddy, Managing Director, Rasoolpura, Begumpet, Hyderabad-500016, Telangana. T: 040-23388587 / 588, F: +91 040-23388582, hmrl.co.in	Conceptual
9	Haryana Mass Rapid Transport Corporation (HMRTC)	Gurugram Metro has received the Public Investment Board's (PIB) approval and will next be tabled for a final sanction by the Union Cabinet. The Haryana Mass Rapid Transport Corporation (HMRTC) expects work to start by March 2023.	60,000	Chanderkant Kataria, General Manager (Finance), C-3, HUDA Complex, Sector 6, Panchkula-134109, Haryana. T: 0172-2563003, gmfmrtc@gmail.com, (Dr D Suresh, Managing Director, mdhmrtc@gmail.com)	Under Implementation
10	Jaipur Metro Rail Corporation (JMRC)	Ashok Gehlot, Chief minister, Rajasthan, gave the nod for the much-awaited Line 1-C extension of Jaipur Metro from Badi Chaupar to Transport Nagar. With this, the entire stretch of 16.5 km of the Line 1 of Jaipur Metro got sanctioned by the state government.	9,935	Sanjay Kumar Yadav-Director (Project)/ Vivek Kumar-Director (O&S), Admin Building, Metro Depot, Bhriagu Path, Mansarovar, Jaipur-302020, Rajasthan. T: 0141-2822756/ 2822780/ 2822101, cmd@jaipurmetrorail.in, dp@jaipurmetrorail.in, dos@jaipurmetrorail.in	Under Implementation
POWER					
11	Department of Power, Government of Arunachal Pradesh	Centre will approve investment for the 2880 MW Dibang Project in Arunachal Pradesh.	320,000	Er Bar Takum Chief Engineer (Power), Vidyut Bhawan, O-Point Tinali, Itanagar-791111, Arunachal Pradesh. M: 09436040417/ 9862086951, wezita@gmail.com	Conceptual
12	SJVN	SJVN Green Energy and Grid Corporation of Odisha (GRIDCO) will form a joint venture to develop a 1,000 MW hydroelectric project and 2,000 MW solar project.	200,000	Shallinder Singh, Sr AGM (HR), Shakti Sadan, SJVN Corporate Head Quarters, Shanani-171006, Himachal Pradesh. T: 0177-2660274, 2660180, ravi_uppal1959@hotmail.com	Conceptual

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UPCOMING PROJECTS

SL No.	COMPANY	PROJECT DETAILS	BUDGET (IN ₹MILLION)	CONTACTS	TYPE
13	Kerala State Electricity Board (KSEB)	Kerala has secured a loan from KfW for implementation of Green Energy Corridor (GEC) projects of Kerala State Electricity Board (KSEB). The state government is implementing the GEC projects at an estimated cost of ₹14.57 billion.	8,170	Vydyuthi Bhavanam, Pattom, Thiruvananthapuram-695004, Kerala. T: 0471-2555544 (Chief Public Relations Officer, T: 0471-2446480, 2514468, M: 09446008179/ Dr B Ashok IAS, Chairman & Managing Director & Director (HRM), T: 0471-2442125, M: 09446008002, cmdkseb@kseb.in / VR Hari, IRS, Director Finance, T: 0471-2448409, M: 09446008003, dfkseb@kseb.in	Conceptual
14	Tata Power	Praveer Sinha, CEO and Managing Director, Tata Power, has announced capital investment to set up 1,000 electric vehicle (EV) charging points, 100,000 solar pumps, microgrids, rooftop and floating solar plants in the next five years.	60,000	Sandeep Bangia, Head- EV/ Praveer Sinha, CEO and MD, Strategy and Business Development Department, Corporate Center Block A, 34 Sant Tukaram Road, Carnac Bunder, Mumbai-400009, Maharashtra. T : 022-67171000, 66658282, BD@tatapower.com	Conceptual

ROADS/HIGHWAYS/BRIDGES

15	National Highways Authority of India (NHAI)	Nitin Gadkari, Union Minister for Road Transport and Highways, has inaugurated the 3 km long, four-deck flyover in Ahmednagar, built by the National Highways Authority of India (NHAI).	800,000	NN Giri, Project Manager, G-5 & 6, Sector-10, Dwarka, New Delhi-110075. T: 011-25074100 - 200, 25093507, 25093514. F: 011-25093507-14 (Rajendra Choudhary, M: 09571669226, rajenc15596@gmail.com/ Harish Sharma, 07727822200/ 011-25074100/200, harishsharma@nhai.org)	Project Update
16	Ministry of Road Transport and Highways	Pema Khandu, Chief Minister, Arunachal Pradesh, said that the Union Ministry of Road Transport and Highways has approved sanction of additional 2,500 km of highways for the state.	440,000	IK Pandey, DG (RD) & SS, Transport Bhawan, 1, Parliament Street, New Delhi-110001, Delhi. T: 011-23739088, dgrdss-rth@nic.in (SK Chakraborty, PPS, T: 011-23739088, M: 09871706242, sk.chakraborty@nic.in)	Conceptual
17	Maharashtra State Road Development Corporation (MSRDC)	The Maharashtra State Road Development Corporation has approved a loan to pay for land acquisition compensation. The decision will give a significant boost to the Virar-Alibaug multi-modal corridor and the Pune ring road projects.	360,000	Director in charge, Near Lilavati Hospital, Opposite Bandra Reclamation Bus Depot, KC Marg Bandra West, Mumbai City-400050, Maharashtra. T: 022-26517931, toll.mumbai16@gmail.com	Conceptual

For more on projects, tenders and contracts, subscribe to **PROJECT REPORTER** at www.ProjectReporter.co.in

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Communication Feature

PERI India celebrates 15 years in India

The celebration was held with stakeholders and customers at the Novotel Hotel, Mumbai.

PERI Team India celebrated the 15th anniversary of the company's successful presence in India. It was celebrated with GGF team members, advisory board members, customers across the country and the entire PERI India team. The company stated, "It has been a great journey for the company in India. What has made us so successful is that in everything we do, we always think first and foremost of the benefits for our customers. Cooperation based on partnership and trust is a fundamental value in our



company, which therefore also forms the basis of our customer relationships. We thank all our esteemed stake holders for the



continued support."

(Communication by the management of the company)

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PRODUCT PARADE

HEAT SEALING FILM

Cortec has launched a new version of its film technology. VpCI-126 PCR corrosion inhibiting film has been developed with a high amount of post-consumer recycled content for the purpose of efficient recovery, recycling, and reuse of resources to minimise the economy's negative ecological footprint. It combines the latest film technology with effective corrosion protection for all metal products. It is heat-sealable and can be used with all types of manual or automated heat-seal packaging equipment.

Contact: Cortec

Website: www.cortecvci.com



EXTENDABLE KITCHEN FAUCETS

Hafele has introduced new models to its range of modern kitchen faucets by Blanco. The Blanco Carena-S from this range comes with extendable spouts enabling easy cleaning with efficiency. The range is extensively tested and certified and thus provides safety in terms of health and hygiene.

Contact: Hafele. Website: www.hafeleindia.com



SOFT-CLOSE CLIP TOP

Blum has unveiled the soft-close clip-top BLUMOTION hinge.

Depending on the application, the 110° hinge allows for thicker doors of up to 24 mm. The new pivoting point prevents the open door from colliding with the cabinet's front edge. It is also available in onyx black and caters to a variety of furniture applications such as wooden shutters, glass, mirror cabinets and more. The clip also offers easy installation possibilities.



Contact: Blum. Website: www.blum.com

FLAMEPROOF INDUSTRIAL LIGHTING

Wipro Lighting has launched its flameproof lighting range, Blazeline. This first-of-its-kind solution-oriented range provides robust and reliable flameproof lighting products designed to withstand hazardous zones and environments. All products under the range are CMFR, BIS and PESO certified thus ensuring maximum safety and quality. The range is exhaustive, providing 90 per cent of the market's requirements. The products are suitable for Ex-d Gas Group IIB, IIC, temperature class T5, T6, Zone 1 and 2, 21 and 22, EPL Gb and Db.

Contact: Wipro Lighting

Website: www.wiprolighting.com



READY-TO-PROCESS TIMBER

Span Floors has launched **Vulcan** extra wide, ready-to-process **timber sections** for exterior applications, for the first time in India. It solves the problem of wood deterioration when used in facade cladding, decking, pergolas, windows and more. These real wood sections, up to 400 mm wide and 190 mm thick, can be finished in a range of colour tones using low-maintenance exterior water-based oil coatings.

Contact: Span Floors. Website: www.spanfloors.com



DISTINCTIVE WASHBASINS

VitrA has launched its **Outline** washbasins. With distinctive designs and cerafine material, these washbasins are available in a variety of shapes including TV, oval, square, and pebble.

They are available in matte black, matte mink, matte taupe, matte white, and white. The design and the durable material make the washbasin suited to all preferences and give a modern touch to the bathroom.

Contact: VitrA
Website: www.vitra-india.com

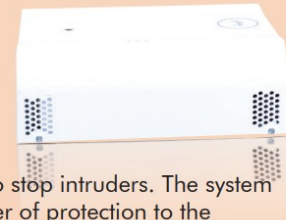


INNOVATIVE FOGGING SYSTEM

Godrej Security Solutions has launched its latest innovation **SmartFog**, a **fogging security system** enabled to stop intruders.

The system adds an extra layer of protection to the overall security ecosystem of banks and jewellers. It utilises advanced technology to detect unauthorised attempts to open any vault or safe. It is equipped with a remote cloud-based application as well as wireless technology for triggering the system. When triggered, Smart Fog emits a thick fog made of concentrated liquefied glycol.

Contact: Godrej Security Solutions
Mob: (0)98202 47847
Website: shop.godrejsecure.com



INTERLOCKING FLOORING SYSTEM

Action TESA has launched **Herringbone Laminate flooring** that has an interlocking system. The range comprises exhaustive designs, patterns and textures. The flooring is unique due to its ease of installation, simple maintenance and easy cleaning methods. These floors are resistant to stains and durable surfaces due to their "Wear Resistant Layer". To avoid stains, scratches and resistance on the surface, an Aluminum Oxide protection sheet is impregnated.

Contact: Action TESA. Website: www.actiontesa.com



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TENDERS

SL No.	ORGANISATION	LOCATION	TENDER VALUE (₹)	EMD/ DOCUMENT COST (₹)	DOCUMENT SALE DATE	SUBMISSION/ OPENING DATE
RAILWAY						
1	South Central Railway	Hyderabad, Telangana	4402878135.5 799999	20000000 / NA	05/04/2023	05/04/2023 / 05/04/2023
<p>Details: Tenders are invited for EPC agreement for the construction of new railway BG line between Chainage 77 km and Chainage 106.8 km works between Pro, Siddipet (Excl.) and Pro. Sirilla (Excl.) stations of Manoharabad - Kothapalli Section of Hyderabad Division, South Central Railway.</p>						
2	Rail Vikas Nigam	Multiple, Himachal Pradesh	9484617892.7 700005	20000000 / NA	23/03/2023	23/03/2023 / 23/03/2023
<p>Details: Tenders are invited for Construction of tunnels t17 to t20 from chainage km 50+900 to km 62+900, station yard and works related to bridges and formation on approaches of such tunnels in connection with new single line broad gauge rail link between Bhanupali-Bilaspur-Beri in the State of Himachal Pradesh, India</p>						
ROADS AND HIGHWAYS						
3	National Highways Authority Of India	Agra, Uttar Pradesh	1066000000	10700000 / 20000	13/03/2023	13/03/2023 / 14/03/2023
<p>Details: Tenders are invited for Improvement works of Agra bypass section from km 0.00 to km 32.800 connecting km 176.800 of NH-2 to km 13.030 of NH-3 in Uttar Pradesh.</p>						
4	National Highways Authority Of India	Kanpur, Uttar Pradesh	8442300000	84400000 / 90000	13/03/2023	13/03/2023 / 14/03/2023
<p>Details: Tenders are invited for the development of six-lane ring road (pkg III) starts from 51.200 to 68.650 (length 17.450 km) around Kanpur city and construction of four-lane airport link road (length 1.45 km) at 62.090 of Kanpur ring road in UP on EPC.</p>						
CONSTRUCTION						
5	Military Engineer Services	Nagrota, Himachal Pradesh	1565000000	8150000 / 3000	10/03/2023	10/03/2023 / 13/03/2023
<p>Details: Tenders are invited for Completion of balance work for construction of residential accommodation at Nagrota</p>						

CONTRACTS AWARDED

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Gawar Construction

Contract value: ₹20.7 billion

Particulars: Highways

Contract awarded for 4 laning of NH5 from Shakral village to Dhalli section (Shimla bypass Pkg 2 and Shimla connectivity) in Himachal Pradesh on HAM.

DRN Infrastructure

Contract value: ₹10.36 billion

Particulars: Water

Contract awarded for DBO Versova Waste water treatment plant.

Reliance Industries (RIL)

Contract value: ₹4.59 billion

Particulars: Logistics

Contract awarded for development, operation and maintenance of the Multimodal logistics park Chennai at Mappedu in Tamil Nadu through public private partnership.

Nyati Engineers & Consultants

Contract value: ₹4.58 billion

Particulars: Institution

Contract awarded for construction of 100 students capacity medical college and a 500 bed hospital building and related works at Satara taluka in Maharashtra.

KCC Buildcon

Contract value: ₹3.68 billion

Particulars: Airport

Contract awarded for resurfacing of runway and allied airfield works including area drainage at Tezpur.

Ion Exchange (India)

Contract value: ₹3.43 billion

Particulars: Oil and Gas

Contract awarded by Indian Oil Corporation for designing, engineering, manufacturing, and more, for five years of Zero Liquid Discharge plant at Panipat Refinery.

Gensol Engineering

Contract value: ₹2.32 billion

Particulars: Renewable Energy

Company has won the auction to develop 30 MW floating solar projects. The projects will be spread over three thermal power stations in Jharkhand and West Bengal.

Jindal Steel & Power

Contract value: ₹1.38 billion

Particulars: Metro

Company won the contract to supply 18 m long head-hardened rails for the Phase 1 projects of the Indore and Bhopal metro systems.

Paras Railtech

Contract value: ₹676 million

Particulars: Metro

Contract awarded by Delhi Metro Rail Corporation to supply and install standard gauge tracks for the Pink Line (Line-7) Extension of the Delhi Metro.

PROPERTY RATES

RESIDENTIAL AND COMMERCIAL

MUMBAI

South Mumbai	Residential *₹/sq ft	Commercial *₹/sq ft
Churchgate	48,864-52,620	27,485-30,358
Cuffe Parade	51,567-61,563	25,278-29,788
Colaba	37,373-45,459	25,252-30,306
Dadar	33,970-38,847	26,623-34,862
Prabhadevi	30,725-37,669	27,142-35,633
Nariman Point	58,872-91,705	32,481-34,888
Napean Sea Road	55,555-75,766	30,302-45,459

Western Suburbs	Residential *₹/sq ft	Commercial *₹/sq ft
Andheri (E/W)	18,307-26,286	15,256-21,231
Andheri (East)	14,140-18,349	13,635-15,870
Bandra (E/W)	33,607-42,776	25,459-35,647
Borivali (E/W)	11,879-15,000	9,701-11,299
Kandivali (E/W)	13,324-17,829	13,324-18,339
Khar (E/W)	33,204-38,537	18,111-24,703
Mahim (E/W)	25,402-34,550	15,241-22,355
Malad	13,418-18,575	12,623-14,560
Goregaon (E/W)	14,269-19,757	12,230-15,198
Vile Parle (E/W)	26,240-30,723	17,661-23,786

Central Suburbs	Residential *₹/sq ft	Commercial *₹/sq ft
Chembur	15,849-21,852	16,359-22,868
Ghatkopar (West)	16,201-17,898	14,985-17,400
Kurla	10,765-14,423	8,124-12,188
Sion (West)	16,270-21,516	14,791-21,914
Wadala	18,908-21,613	17,913-20,105

Navi Mumbai	Residential *₹/sq ft	Commercial *₹/sq ft
Airoli	7,970-9,258	3,985-6,038
CBD Belapur	8,175-10,158	4,087-8,126
Kharghar	6,933-9,376	5,526-6,809
Nerul	16,041-18,946	7,130-10,186
Panvel	7,195-9,022	2,878-5,713
Vashi	14,378-18,246	6,119-9,122
Kamothe	8,006-8,307	6,042-11,867
Kalamboli	5,084-6,610	2,542-4,271
Sanpada	11,369-15,779	9,393-14,980
Juinagar	8,194-10,182	5,122-10,182
Koperkhairane	11,677-13,652	5,561-6,850

Contact: Bhavin Kanabar, Space Realtors (India), Mumbai. Tel: 022-4299 9999. Mobile: (0) 99677 80009. Website: www.spacerealtors.in
Neeraj Agarwal, Sunny Real Estate Consultants, Navi Mumbai. Mobile: (0) 97027 33333. Website: www.sunnyconsultants.com

* The rates are subject to change based on the market fluctuations.



KOLKATA

Kolkata	Residential *₹/sq ft	Commercial *₹/sq ft
Alipore	12,724-16,495	14,315-15,441
AJC Bose Road	13,784-17,402	12,798-14,985
Ballygunge	9,953-11,544	9,156-11,445
Behala	4,169-4,613	6,452-8,021
Bhawanipore	10,991-12,163	10,973-13,332
Belvedere Road (Alipore)	12,377-18,700	9,520-10,286
Garcha Road	9,508-12,147	5,280-6,338
Kaikhali VIP Road	3,930-5,295	6,697-7,353
Lake Town	5,735-6,099	4,573-5,554
Naktala Road	4,544-5,602	8,582-9,915
New Alipore	6,995-8,847	13,371-16,460
Park Street	14,983-21,377	14,983-20,810
Prince Anwar Shah Rd	13,262-14,443	8,243-11,554
Salt Lake (Sec V)	7,284-8,701	3,938-5,317
New Town (Rajarhat)	5,619-6,773	4,703-6,720
Shakespeare Sarani	15,731-19,366	15,731-19,864
Thakurpukur	3,692-4,084	5,924-6,960
Baguihati	2,867-3,050	6,819-7,652
Sealdah	9,124-10,376	6,254-7,297
Park Circus Connector	6,617-10,268	10,701-14,740
Garia	5,884-7,332	5,419-7,540
Shyambazar	8,530-10,842	9,533-13,799

Contact: Pioneer Property Management, Kolkata.
Tel: 033-4002 5555, 4018 5555. Mobile: (0) 98300 56308.
Website: www.pioneerproperty.in

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RESIDENTIAL AND COMMERCIAL

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Chennai	Residential *₹/sq ft	Commercial *₹/sq ft
Alwarpet	13,621-22,044	16,029-19,496
Anna Nagar	8,352-12,899	7,037-9,675
Ashok Nagar	7,362-12,800	10,927-11,877
Basant Nagar	11,499-17,911	9,687-12,451
Egmore	11,956-16,441	17,069-18,641
Kilpauk	8,789-14,823	14,946-19,571
Guindy	11,050-16,014	13,725-16,668
Kodambakkam	13,765-19,118	13,765-19,118
Lloyds Road	15,505-17,749	15,975-18,214
Mylapore	11,114-19,856	20,007-23,784
Mogappair	5,074-7,834	9,882-15,373
Perungudi	6,123-8,363	7,639-9,533
Nungambakkam	14,995-19,049	16,663-19,485
Anna Salai	18,669-19,861	19,705-21,390
Thanikachalam Nagar	12,995-16,711	12,995-16,711
Tambaram	4,431-5,646	5,243-7,705
Thiruvanmiyur	8,864-11,350	9,001-11,929
Velachery	11,717-14,794	11,815-15,470

Contact: Prabhu B, Atlas Estates. Tel: 044-4861 6554.
Mobile: (0) 99419 45554. Website: www.atlasestates.in

DELHI

Delhi	Residential *₹/sq yard	Commercial *₹/sq ft
Connaught Place	30,215-36,387	19,034-46,263
Chanakypuri	22,051-31,155	33,886-63,083
Defence Colony	19,008-25,599	29,222-50,189
Dwarka	3,754-16,116	7,038-22,941
Greater Kailash	15,079-20,100	25,651-44,517
Hauz Khas	21,078-30,358	20,594-35,437
Janpath	26,103-41,772	24,747-43,129
Kalkaji	8,130-10,192	11,930-16,547
Karol Bagh	16,031-19,919	13,526-34,857
Rajendra Nagar	3,021-3,404	14,828-30,436
Saket	12,473-15,543	23,279-43,727
Vasant Vihar	13,380-17,041	18,993-35,501

NCR

Lajpat Nagar-Ghaziabad	3,040-4,532	4,598-6,703
New Gurgaon	5,686-6,803	6,795-56,164
Greater Noida West	3,572-4,065	4,346-37,382

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ACC								
Grade 43	8,741	9,963	9,221	8,216	8,137	9,173	9,049	8,291
Grade 53	9,251	9,227	9,087	8,998	8,689	8,708	8,577	8,327
PPC	8,504	10,029	9,144	8,574	8,490	9,429	9,245	8,211
Ambuja								
Grade 43	8,675	9,887	9,150	8,155	8,075	9,105	8,980	8,228
Grade 53	9,236	9,101	8,964	8,877	8,675	8,577	8,459	8,213
PPC	8,515	9,943	9,157	8,584	8,501	9,334	9,258	8,141
Ultratech								
Grade 43	8,675	9,912	9,175	8,155	8,075	9,105	9,219	8,228
Grade 53	9,241	9,129	9,208	9,119	8,681	8,582	8,465	8,218
PPC	8,476	9,923	9,138	8,546	8,463	9,291	9,239	8,104
Birla Super								
Grade 53	8,667	9,178	9,221	9,327	9,236	10,185	9,248	8,244
White Cement								
Birla	34,717	29,517	28,508	24,130	23,896	26,898	25,296	28,561
JK	36,962	27,169	28,854	28,574	25,670	248,561	29,366	28,511
Coromandel Cement								
Grade 43	9,157	NA	8,685	8,601	8,673	9,094	8,526	8,278
Grade 53	8,511	NA	9,232	8,247	8,167	9,874	8,766	8,254
PPC	9,076	NA	8,717	8,632	9,045	9,060	8,356	8,113
Vasavadatta Cement								
Grade 43	9,350	NA	8,696	8,612	8,685	NA	9,019	8,756
Grade 53	8,677	NA	9,209	8,247	8,167	9,619	NA	8,721
PPC	9,262	NA	8,723	8,638	9,052	8,832	NA	NA

GST 28 per cent included for all cities.

Mumbai: Tejas J Vora, Recons Group of Companies. Tel: 022-6169 1000, 2617 3045. Mobile: (0) 98336 73045. Shekhar, Neelesh Industrial Agency. Tel: 022-2408 2121. Mobile: (0) 93247 16192. Kirti Shah, Paras Sales Corporation. Mobile: (0) 92241 87800. **Delhi:** Girish Agarwal, Mahabir Building Material Store. Tel: 011-2664 2348. Mobile: (0) 98100 62315. **Chennai:** C Vijay, Chendur Murugan Cements. Mobile: (0) 96001 67888. **Pune:** Ravindra, Kamal Distributors. Mobile: (0) 98224 28574. **Hyderabad:** Ramesh, Sai Ram Steel Traders. Mobile: (0) 93934 57676, 93927 47575. **Bengaluru:** A Vinod, Sri Kodikrupa Enterprises. Mobile: (0) 97311 16894. **Ahmedabad:** PD Agrawal, Agrawal Traders. Tel: 079-2585 1616. **Kolkata:** Pintu Roy, Arun Distributors. Tel: 033-2557 8632. Mobile: (0) 98309 97677, 98309 97672.

PAINTS: ENAMEL-WHITE

(4 litre: Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
Asian Paints	1,423	1,390	1,305	1,282	1,476	1,431	1,255	1,350
Kansai Nerolac	1,423	1,390	1,305	1,250	1,476	1,431	1,255	1,350
Berger	1,423	1,390	1,291	1,257	1,476	1,431	1,255	1,350
Shalimar	1,423	1,390	1,298	1,257	1,476	1,431	1,255	1,350
ICI	1,423	1,390	1,298	1,438	1,476	1,431	1,255	1,350

18 per cent GST extra for all cities.

Mumbai: Pragnesh Kapasi, Poojan Colour Point. Mobile: (0) 78755 18999. **Delhi:** KL Wasan, Wasan Enterprises. Mobile: (0) 98105 81561, 98716 66577. **Chennai:** Umesh Dave, Tamilnad Traders. Mobile: (0) 72000 97550. **Pune:** Tejas Vora, Shahabad Cement Depot. Tel: 020-2588 5700. Mobile: (0) 99608 00820. **Hyderabad:** Mukesh Chaudhary, Tirupathi Hardware. Mobile: (0) 99633 47374. **Bengaluru:** GV Balakrishna, Balaji Paints and Hardware. Mobile: (0) 94487 55711. **Ahmedabad:** Shanti Prajapati, Swastik Traders. Tel: 079-2646 4766. **Kolkata:** Saif Alam, Hindusthan Paints. Tel: 033-4060 5635, 36. Mobile: (0) 80480 05598.

CLEAR GLASS

(Unit: 1 sq ft; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
4 mm	57	42	47	66	48	54	55	54
5 mm	65	46	55	88	54	66	63	64
6 mm	82	56	68	102	66	77	73	73

GST 18 per cent included for all cities.

Mumbai: Shabbir, Galaxy Glass Dealers. Tel: 022-2568 4351. Mobile: (0) 98207 69157. **Delhi:** Ajay Dhamija, Ajay Glass. Mobile: (0) 98102 65787. **Chennai:** Mohammed Inaamullah, Metro Glass Corporation. Mobile: (0) 98400 30316. **Pune:** Nomani Kachwala, Poona Glass Depot. Tel: 020-2445 9238. Mobile: (0) 99602 50786. **Hyderabad:** Firoz Hussain, Safe Glass Store. Tel: 040-6515 2786. Mobile: (0) 90006 52786. **Bengaluru:** AV Stayanarayan, Sri Venkateshwara Glass and Plywoods. Mobile: (0) 93437 05809. **Ahmedabad:** Anil Maken, Rajkamal Corporation. Tel: 079-2220 4090. Mobile: (0) 93761 12220. **Kolkata:** Pradeep Khetan, RP Glass Traders. Mobile: (0) 93304 60999.

BUILDING MATERIAL PRICES

WOOD

(Unit: 1 cu ft; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
Sal Wood	821	2,079	2,138	700-2,300	700-1,500	600-1,300	500-1,300	2,519
Silver Wood	679	1,538	522	615	1,346	450-1,200	400-1,200	1,760
Sagwan Wood	1,568	1,600-4,000	2,460	1,742	1,000-4,500	2,050	1,449	2,433
Pine Wood	784	538	1,205	436	650-800	410-6,900	NA	600-1,200

PLYWOOD

(Unit: 1 sq ft; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
Commercial								
4 mm	31	42	29	42	38	44	40	37
6 mm	38	52	41	53	48	45	41	45
12 mm	53	48	58	65	59	59	68	55
18 mm	56	99	79	73	66	86	89	62
Waterproof								
4 mm	38	35	43	47	50	48	61	54
6 mm	54	45	61	59	66	61	69	62
12 mm	65	55	90	79	69	97	98	80
18 mm	81	75	111	95	102	102	80	98

MDF

(Unit: 1 sq ft; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
6 mm	37	23	28	35	38	37	56	54
9 mm	35	24	29	34	50	44	72	59
12 mm	44	35	41	45	50	54	79	84
18 mm	49	46	53	54	62	66	92	79

GST 18 per cent included for all cities.

Mumbai: Lucky Ply & Laminates. Tel: 022-6113 0000, 2871 2556. Mobile: (0) 74981 88777. E-mail: umesh@timexply.com. Bharat Kothari, Kunal Timber. (Wood, Plywood, MDF). Tel: 022-2836 5879. Mobile: (0) 98696 20982. **Delhi:** Gangan Mohan, Ashu Plywood. Mobile: (0) 98117 16949. **Chennai:** Deva Kumar, BIS Building Interior Solutions. Mobile: (0) 90430 72221. **Pune:** Praful Chaudhary, Kailash Shah, Mayur Plylam. Tel: 020-2638 6678. (Wood, Plywood, MDF). Harshid Jain, Shree Vinayak Plywood & Hardware. Mobile: (0) 98237 48729. **Hyderabad:** Ali Mohammed, New Fame Timber Traders. Tel: 040-3951 7454. Mobile: (0) 98480 43123, 98853 78122, 90000 10700. **Bengaluru:** Poonam Kumar, Laxmi Home Studio. Tel: 080-3376 3006. Mobile: (0) 97425 55195. (Plywood, MDF). Shahabuddin Ali, Inaam Timber and Steel. Mobile: (0) 98453 40921. (Wood). **Ahmedabad:** Sumit Bagrecha, Virshakti Plywood. Mobile: (0) 98791 66731, 96620 04353. **Kolkata:** Ratanlal Khemka, Shree Chaitanya Timbers. Tel: 033-2560 4129. Mobile: (0) 98302 73976.

ELECTRICAL WIRES

(Unit: 1 m; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
1.5 sq mm	25	29	27	24	27	22	21	20
2.5 sq mm	26	33	35	29	50	30	28	35
4 sq mm	45	54	48	30	73	51	47	44

GST 18 per cent included for all cities.

Mumbai: Sushil Electricals & Company. Tel: 022-2208 4491. **Delhi:** Sanjay Taneja, Taneja Electrical & Lights. (Polycab). Tel: 011-6622 3747, 4644 0016. JS Electricals. Mobile: (0) 98111 56558. (Finolex). **Chennai:** Askhok Kumar, Sree Tambaram General Stores. Mobile: (0) 97890 50501. **Pune:** Hitesh Parwani, Parwani Enterprises. Tel: 020-3993 6427, 4276 5947. Mobile: (0) 98904 76754. **Hyderabad:** Ramesh, Ramesh Electrical. Tel: 040-2770 0809, 6638 5400. Mobile: (0) 93488 88088. **Bengaluru:** Muni Raj, Amar Electricals. Tel: 080-2225 8173. **Ahmedabad:** Anil Patel, Darshna Electricals. Mobile: (0) 99980 11000, 99743 18982. (Finolex). **Kolkata:** Anand Singh, Sinha Electric Stores. Tel: 033-2235 4821. Mobile: (0) 90070 30333, 98302 70590.

STONES and TILES

(Unit: 1 sq ft; Price in ₹)

	Mumbai	Delhi	Chennai	Pune	Hyderabad	Bengaluru	Ahmedabad	Kolkata
Granite	147-2,048	68-263	89-305	68-8,505	74-226	65-420	97-336	65-807
Marble	82-224	66-214	69-286	80-469	63-255	51-469	66-342	76-4,316
Makrana	672-1,155	210-1,260	200-903	105-1,596	79-1,050	53-473	65-735	107-1,530
Kota	51-80	37-55	46-81	48-79	55	62	51-70	39-74
Cuddappa	50	54	42-67	42-60	35-45	42-67	42-74	46

GST 18 per cent extra for all cities.

Mumbai: Sushil Vohra, Vikas Marble & Granite. Tel: 022-2846 4150. Mobile: (0)98923 43332. **Delhi:** Alok Hasija, Meera Marbles. Mobile: (0) 98111 11569, 92120 43662. **Chennai:** Sunil Agarwal, Sunshine Marbles & Granites. Mobile: (0)91766 14499. **Pune:** Santosh Ganeshkar, Mohan Stone Depot. Tel: 020-2612 8805. Mobile: (0) 98605 03142, 98220 24803. **Hyderabad:** Mohammad Abdul Muqet, Super Stones & Marbles. Mobile: (0) 99662 83516, 98855 13354. **Bengaluru:** Mohammed Ali, Avon Granite and Marble Company. Mobile (0) 98805 92017. **Ahmedabad:** Rakhi T Neema, Rudra Ceramic and Stone. Tel: 079-3049 5171. Mobile: (0) 78785 01212. **Kolkata:** SK Singh, Durga Marble and Tiles Co. Tel: 033-2552 1425. Mobile: (0) 94333 56962.

STEEL (Unit: 1 mt; Price in ₹)

	Material	Mumbai*	Delhi*	Chennai*	Pune	Hyderabad*	Bengaluru*	Ahmedabad
Reinforcement								
MS	6 mm dia	64,629	52,272	52,547	68,254	51,703	73,071	52,506
TMT	8 mm dia	65,075	52,011	52,076	65,614	50,758	76,539	52,035
↑	10 mm dia	64,364	52,058	52,435	64,676	50,806	75,661	52,394
TMT	12 mm dia	64,994	52,134	52,251	64,465	50,878	75,425	52,209
TMT	16 mm dia	64,018	51,866	51,982	64,134	52,666	75,037	51,940
TMT	20 mm dia	64,498	52,115	52,284	64,490	50,861	75,444	52,243
TMT	25 mm dia	64,261	51,907	52,024	64,184	53,390	75,097	51,981
Angle	50 x 50 x 6	64,991	49,373	48,351	67,366	51,556	68,030	52,736
	150 x 150 x 12	68,894	49,370	48,214	67,335	51,415	75,987	52,594
Channel	75 x 40	65,647	49,271	48,185	67,625	51,383	68,556	52,022
	100 x 50	65,783	49,694	48,647	68,249	51,820	68,516	53,195
	125 x 65	66,755	50,019	47,624	68,329	51,467	68,329	52,519
	150 x 75	66,231	49,975	49,422	68,609	51,421	68,609	52,734
	200 x 75	67,295	49,597	49,391	69,869	51,031	69,205	52,698
	300 x 90	69,553	49,922	49,565	72,146	51,368	70,811	52,889
	400 x 100	71,154	49,416	48,918	72,270	51,504	72,487	52,037
Beams	125 x 70	66,881	46,967	47,891	66,546	49,582	67,192	52,929
	150 x 75	66,722	48,326	49,163	68,159	51,151	68,820	54,328
	200 x 100	66,840	49,633	49,679	69,698	51,689	69,698	54,904
	250 x 125	68,211	49,587	49,816	71,742	51,779	70,401	55,727
	300 x 140	68,912	49,435	49,479	71,422	51,483	71,422	55,493
	400 x 140	70,413	48,720	48,897	73,048	50,873	71,076	54,831
	450 x 150	71,612	48,700	48,097	71,367	50,044	70,719	53,943
	500 x 180	73,762	49,819	49,268	74,994	51,258	74,332	55,116
	600 x 210	75,579	49,852	56,008	NA	52,624	78,474	55,211
Plates	5-12 mm	74,299	41,143	45,940	75,997	NA	73,057	44,187
	12-20 mm	74,073	38,786	43,534	73,080	NA	70,292	42,392
	21-40 mm	74,008	39,319	45,490	72,767	NA	73,820	43,270

GST 18 per cent extra applicable for all cities.

Mumbai: Sunil Nagori, Viswanathan Iyer, Sansui Steels. Tel: 022-2867 3673. Mobile: (0) 98211 13673, (0) 98211 10010. **Pune:** Ashish Kasat, Manish Industrial Corporation. Tel: 020-2566 8682, 2612 4182. Mobile: (0) 94220 15212. **Chennai:** Kunal Maheshwari, Kapil Metal Processing Agencies. Tel: 044-2522 5443. Mobile: (0) 95000 95902. (Ravi Sanker). **Hyderabad:** Sushil Kumar, Sanjay Agarwal, Tulja Bhavani Ispat. Mobile: (0) 92477 85403, 98480 14420. **Bengaluru:** Umang Agarwal, Kaushalesh Steels. Mobile: (0) 98450 22217. **Ahmedabad:** Ankit Mehta, Shree Mallinath Steel Traders. Tel: 079-6524 7800. Mobile: (0) 99254 60170.

*Figures are approximate and subject to change



DIARY
EXHIBITIONS, CONFERENCES AND SEMINARS

SL No.	EVENT	DATE	ORGANISER	LOCATION
MARCH 2023				
1	India Smart Utility Week 2023	1-4 March 2023	India Smart Grid Forum (ISGF)	International Conference & Exhibition, New-Delhi
2	Acres 2023	14-16 March 2023	Informa Markets in India	Bombay Exhibition Centre, Mumbai
3	CONEXPO-CON/AGG	14-18 March	Association of Equipment Manufacturers	Las Vegas
4	8th Smart Cities Expo	27-29 March 2023	Exhibitions India Group	Pragati Maidan, New Delhi
APRIL 2023				
5	Roof India 2023	27-29 April 2023	Hyve Group	Bombay Exhibition Centre, Mumbai
6	Floor India Exhibition 2023	27-29 April 2023	Hyve Group	Bombay Exhibition Centre, Mumbai
MAY 2023				
7	The LED Expo	11-13 May 2023	Messe Frankfurt	Bombay Exhibition Centre, Mumbai
8	Project Qatar 2023	29 May-1 June 2023	IPF Group	Doha Exhibition & Convention Center (DECC),
9	Index Exhibition	26-28 May 2023	UMG Index Trade Fairs	Jio Convention Centre, Mumbai
JUNE 2023				
10	Architech & Interior Expo 2023	25 June 2023	Neventum Trade Shows	Chennai Trade Centre, Chennai
11	India Wood 2022	2-6 June 2023	Nunberg Messe	BIEC, Bangalore
SEPTEMBER 2023				
12	GSSE	14-16 September 2023	Virgo Communications	Bombay Exhibition Centre
13	Expo Paint & Coatings	23-25 September 2023	Toredo Fairs India	Dhaka, Bangladesh
OCTOBER 2023				
14	Fire India 2023	5th - 7th October 2023	Services International	Bombay Exhibition Centre, NESCO, Goregaon, Mumbai

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Gates India	79	79	<input type="checkbox"/>	Supreme Industries	17	17	<input type="checkbox"/>
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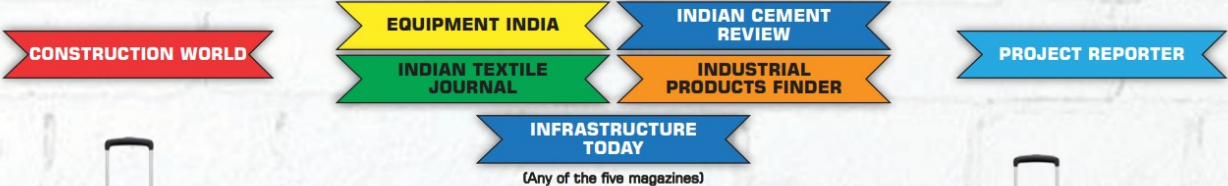
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TWIT-BITS

 Snaps from the picturesque #Amritsar_Jamnagar_Expressway
Parallel to the Indo-Pak border, this greenfield corridor will connect the key industrial and agricultural hubs of north India with the ports of west India.


#PragatiKaHighway
#GatiShakti



@nitin_gadkari



 @RailMinIndia
Final leap!
The superstructure of a critical bridge of length 104.84 m has been successfully launched on the hilly terrain in Mewat, Haryana. This stands at the junction of the tunnel through the Aravalli Hills & high embankment on the Western Dedicated Freight Corridor.

 Report "Assessment of Avoided CO2 Emissions during Construction and Operation of National Highways" released: New & improved state of the art National Highways to help avoid CO2 emissions by reducing fuel combustion in vehicles plying on them.

@PIBMoRTH

 CIL subsidiary Northern Coalfields Ltd. has recently commissioned a giant electric shovel. The shovel having 20 cubic meter bucket capacity has been commissioned at Amlohri OCP, NCL. This will help accelerate production at NCL.

@CoalIndiaHQ



 The Delhi-Mumbai Expressway, a flagship project under Bharatamala Pariyojana, will be providing seamless connectivity across 6 states along with 8 economic nodes. Thus, boosting economic growth by facilitating faster logistics movement across the country.

#NHAI #PragatiKaHighway
@NHAI_Official




 @MumbaiMetro3
Experience the journey through tunnels and underground stations of package 5 from #Dharavi to #Santacruz via #BKC & #Vidyanagari.


Scan to watch video




Factory Acceptance Test (FAT) successfully done for two Afcons' TBMs for DMRC DC-05 project. The TBMs will be deployed in the month of March 2023. They will be used for tunnelling between Derawal Nagar Station and Pul Bangash Station in north Delhi.

 AFCONS Infrastructure



 At its head office, @nmdclimited signed an Agreement for Collaborative Research with CSIR-IMMT, Bhubaneswar, in the presence of Director (Production) Shri. Dilip Kumar Mohanty, marking a #critical step towards #AatmanirbharBharat.

@SteelMinIndia



NEWSMAKERS



TRANSFORMER

Former commerce secretary **BVR Subrahmanyam** has been appointed as CEO of the NITI Aayog for a tenure of two years. A 1987 batch IAS officer of the Chhattisgarh cadre, he holds an engineering degree and a management degree from London Business School. What's more, he is a widely experienced bureaucrat, having worked as chief secretary of the Union Territory of Jammu and Kashmir, additional chief secretary (home), Chhattisgarh and joint secretary in the PMO between 2004-2008 and March 2012-March 2015, serving under Manmohan Singh and Narendra Modi. Subrahmanyam with his experience in the commerce ministry would bring the much-needed expertise to the country's top think tank.

GLOBAL ACHIEVER

Former Niti Aayog CEO, **Parameswaran Iyer** has been appointed as the Executive Director of World Bank headquarters. He will assume charge of the post for three years. Iyer comes with over 25 years of experience in the water and sanitation sector. What's more, he has spearheaded the implementation of India's flagship \$20-billion Swachh Bharat Mission, which successfully delivered access to safe sanitation to 550 million people. With an illustrious career spanning four decades, he has worked in various capacities with the government, the World Bank and in several countries including Vietnam, China, Egypt and Lebanon. In India, he also headed the innovative community-led Swajal Project in Uttar Pradesh and Uttarakhand, which became one of the world's leading rural water projects pioneering decentralised service delivery.



EXPRESS EXECUTER

With the 246 km Delhi-Dausa-Lalsot section of the Delhi-Mumbai Expressway open to commuters, **Mudit Garg**, Project Director, NHAI, has added another achievement to India's infrastructure growth. Developed at a cost of more than ₹121.50 billion, this first completed section of India's longest expressway, the Delhi-Mumbai Expressway, will provide a major boost to the economic development of the entire region. It is expected to halve the commute time between Delhi and Mumbai from nearly 24 hours to 12 hours and shorten the distance by 130 km. The expressway will pass through Delhi, Haryana, Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra and connect major cities. It will also serve 93 PM Gati Shakti Economic Nodes, 13 ports, eight major airports, and multi-modal logistics parks (MMLPs).



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