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CIN: L99999MH1946PLC004768
<table>
<thead>
<tr>
<th>Equipment &amp; Machinery</th>
<th>Vermeer</th>
<th>33</th>
<th>Sharp Ply</th>
<th>67</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE</td>
<td>Vibrant Const.</td>
<td>11</td>
<td>Component &amp; Spare part</td>
<td></td>
</tr>
<tr>
<td>Akona</td>
<td>Wirtgen India</td>
<td>29</td>
<td>Electromagnetic</td>
<td>102</td>
</tr>
<tr>
<td>Ammann Apollo</td>
<td>Crane &amp; Material Handling</td>
<td>53</td>
<td>Srons Engg.</td>
<td>39</td>
</tr>
<tr>
<td>Apollo Techno</td>
<td>ACE</td>
<td>13</td>
<td>Tyre Experts</td>
<td>27</td>
</tr>
<tr>
<td>2nd IFC</td>
<td>CMAC</td>
<td>87</td>
<td>Waterproofing</td>
<td></td>
</tr>
<tr>
<td>Atlas Copco</td>
<td>Liebherr</td>
<td>97</td>
<td>STP</td>
<td></td>
</tr>
<tr>
<td>Capious Roadtech</td>
<td>Crushing &amp; Screening</td>
<td>07</td>
<td>KONE</td>
<td></td>
</tr>
<tr>
<td>CMAC</td>
<td>CDE Asia</td>
<td>55</td>
<td>Iron &amp; Steel</td>
<td>93</td>
</tr>
<tr>
<td>Dynapac</td>
<td>Propel</td>
<td>21</td>
<td>Kamlesh Metal</td>
<td></td>
</tr>
<tr>
<td>Dynemix India</td>
<td>Th Company</td>
<td>41</td>
<td>Readymix Concrete</td>
<td>41</td>
</tr>
<tr>
<td>Escorts Const.</td>
<td>Block, Brick &amp; Precast</td>
<td></td>
<td>Ultratech</td>
<td></td>
</tr>
<tr>
<td>GHG</td>
<td>Elematic</td>
<td>37</td>
<td>Plywood/Fiber Board</td>
<td>49</td>
</tr>
<tr>
<td>iZwara (KRS Group)</td>
<td>Neptune</td>
<td>08</td>
<td>Jolly Board</td>
<td>67</td>
</tr>
<tr>
<td>JCB</td>
<td>MASA</td>
<td>15</td>
<td>Sharp Ply</td>
<td></td>
</tr>
<tr>
<td>Gate Fold</td>
<td>Ruby Enterprise</td>
<td>10</td>
<td>bauma Conexpo India</td>
<td>71</td>
</tr>
<tr>
<td>KYB-Conmat</td>
<td>Formwork &amp; Scaffolding</td>
<td>81</td>
<td>Infracom</td>
<td>95</td>
</tr>
<tr>
<td>L &amp; T Komatsu</td>
<td>Mitaka Aluform</td>
<td></td>
<td>WOC – India</td>
<td>75</td>
</tr>
<tr>
<td>Manitou Equip.</td>
<td>2nd Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simpson &amp; Co.</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speedcraft</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tata Hitachi</td>
<td>IFC</td>
<td></td>
<td></td>
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</tbody>
</table>

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Contents

JANUARY 2021

News
16 Infra Development
16 Airport & Port
18 Road & Highway
20 Metro & Rail
22 Tunnel & Bridge
26 Real Estate
94 Equipment

Viewpoint: Infrastructure
28 Survival Challenges for Construction Companies Vinod Behl
99 Will it be Springtime for the CE Sector? S.K. Khanna

Tunnelling - Opportunities & Technologies
32 India’s Tunnelling Industry driven by robust pipeline of projects & investment Sunil Sharma
40 MMC Gamuda successfully completes its tunnels on Putrajaya Line in Malaysia Joyce Shamini
48 Sandvik DT 821C Tunneling Jumbo: Setting a New Standard in Speed & Precision
50 German manufacturer GHH brings special Shotcreting Machine to help complete Mumbai Nagpur Expressway
52 CRCHI’s EPB TBM ‘Victory’ Achieves New Records in Construction of Moscow Metro
54 Epiroc: Tunneling Opportunities on the Rise in India Anirban Sen

Real Estate
60 Real Estate Year End 2020: Review & Outlook 2021
66 Emerging Segments & Trends
70 Portable Multipurpose Reusable Living Units (PMRLU) for Onsite Workers
72 B.E. Billimoria builds Maharashtra Police Housing project using Precast Technology
88 Sustainable Design for Affordable Housing in Warm-Humid Climate Regions S. K. Singh
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CONTENTS
JANUARY 2021

Equipment & Machinery
76 CASE launches CX220C Crawler Excavator in India
78 The Wirtgen Group: New Generation of Material Feeders from VÖGELE
80 Liebherr unveils three new Machines and one new Design

Customer Engagement
82 Time to change the thought process of service providers

Worker’s Safety
84 How Equipment and Machine Health Impact Worker’s Safety

Events
98 IEE Expo 2022: Connecting the Entire Value Chain of Elevators and Escalators in India
100 CII Announces EXCON 2021
101 Minister of Road Transport & Highways and MSME unveils ICEMA’s Vision Plan 2030 for Construction Equipment Industry

Advertisers' Index--------- 10
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Infrastructure Development

Govt infuses ₹6,000-cr in NIIF’s debt platform
The Union Cabinet has approved the infusion of ₹6,000 crore as equity into a new debt platform to generate about ₹1.1 lakh crore funds for financing infra projects by 2025. Of the equity to be injected by 2021-22, the Cabinet has also approved ₹2,000 crore for disbursement this year subject to the funds being required. Stimulus measure announced by the FM is a part of the plan to provide equity capital to the debt platform sponsored by the NIIF, as part of the last round of the stimulus measures.

Infra projects worth ₹44 lakh-cr reach implementation stages
The Central government is implementing infra projects worth ₹44 lakh crore as a part of the ₹111 lakh crore National Infrastructure Pipeline (NIP) and projects worth ₹22 lakh crore accounting for 20% of NIP are under construction. The framework of NIP includes 39% investment by the Centre, 40% by the states and 21% by the private players across roads, ports and highways, waterways and power sectors and the targeted funds will be invested by 2024-25.

Centre unveils ₹3,000-cr waterway projects in Assam
The Central government is all set to take up ₹3,000 crore projects to improve waterways and transportation infrastructure in Assam in the Brahmaputra and Barak rivers to boost trade in the entire northeastern region and neighboring states. The Union government is working out modalities to improve navigability, transportation, trade and commerce in Brahmaputra and Barak rivers to achieve scalable height in trade and commerce.

Control cement and steel prices: CREDAI
CREDAI has written to the PM and all concerned ministries urging to take note of cartelization by cement and steel manufacturers. CREDAI also called upon the government for an immediate intervention in regulating the prices of construction raw materials amidst the ongoing pandemic as Indian real estate is one of the worst-hit sectors due to the COVID 19 pandemic.

Airport & Port

Zurich AG finalizes master plan for Jewar airport
To build the international airport project on a fast-track basis, Zurich AG, the concessionaire appointed to develop and operate the Jewar international airport, has finalized and submitted its master plan to Noida International Airport Limited (NIAL). Special purpose vehicle, set up to build the mega aviation project, will go through the plan and also get it vetted by regulatory bodies as well as the Union civil aviation ministry before unveiling the same next year.

Odisha inks MoU for ₹4,000-cr riverine port in Mahanadi
The Odisha government has signed a Memorandum of Understanding (MoU) with the Centre for setting up of ₹4,000 crore riverine port projects in Mahanadi. The proposed port will come up at Akhadasali village under Mahakalapada block in Kendrapara district, 13 km from the river mouth at Paradip. This all-weather and multi-user port on the river will be set up in Public-Private Partnership (PPP) model with a capacity of 54 MTPA.
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**Road & Highway**

**TN clears ₹13,000-cr peripheral ring road project**

The Tamil Nadu government has cleared the 133.65-km long Chennai Peripheral Ring Road project involving an investment of ₹13,000 crore. The project is being funded by JICA in a phased manner. The second and third phases, which are being financed by the Asian Infrastructure Investment Bank (AIIB), will start from Ennore Port to Poonjeri Junction in Mamallapuram. The entire project will be completed in five phases and the first phase is likely to be started soon with certain changes in the alignment.

---

**MoRTH takes up ₹30,000-cr road projects in Bihar**

Union road transport minister has informed that road projects involving an investment of ₹30,000 crore are underway in Bihar and a sum of ₹4,600 crore has been released to farmers for acquiring their land. Under the PM package, which involves 24 projects with a length of 1459 km, the work is on for over 875 km and the tender for 125 km has been issued, while for another 459 km the tender will be released shortly.

---

**Nagaland gets ₹4,127-cr national highway project**

Union transport minister has laid the foundation stone for ₹4,127-crore highway projects in Nagaland, which require a total length of 270-km. The project will provide an alternate access from Imphal to Dimapur and connect Kohima to the Phek district and Myanmar border.

---

**IRCON wins ₹900-cr project on HAM model in Haryana**

Ircon International has been awarded the work for up-gradation of Gurgaon-Pataudi Rewari section of the NH-352-W highway. The project, which involves an investment of ₹900 crore, requires a design length of 46.110 km and will be built in Haryana on Hybrid Annuity Model.

---

**NHIDCL launches Kohima-Jessami NH project in Nagaland**

National Highway Infrastructure Development Corporation has launched the construction work of the two-laning with hard shoulder of Kohima-Jessami road on NH-29. The foundation stone for the project along with score of other road projects in Nagaland were laid virtually by the Union transport minister.

---

**MoRTH unveils new road link to Jewar International Airport**

Union transport minister Nitin Gadkari has informed that the ministry will take up the construction work for a greenfield link to the upcoming Jewar airport in UP to cater to the future needs of travelers. The new link to the airport will be built to connect the upcoming Delhi-Mumbai Expressway at Ballabhgarh to the airport. Work on the new link from Delhi to Dehradun via Baghat and Saharanpur is being expedited on a fast-track basis.

---

**UP takes up ₹751-cr Lucknow-Kanpur road project**

Construction work on the Lucknow-Kanpur greenfield expressway, involving an investment of ₹751 crore, is all set to start. Home Minister Rajnath Singh and MP from Lucknow informed that next year, on December 25, the birth anniversary of Atal Bihari Vajpayee, vehicles will start plying on the Kisan Path and Lucknow to Kanpur will become a 45-minute drive.

---

**MoRTH kick-starts ₹7,500-cr road projects in UP**

Union transport minister has laid the foundation stones of 16 highway projects in UP. These highway projects cover a road length of 505 km in total and the construction of these infra projects will involve an investment of ₹7,500 crore.

---

**Dilip Buildcon gets LoA for HAM road project in Gujarat**

Dilip Buildcon has received the Letter of Acceptance (LoA) from the National Highways Authority of India for a road project to be built on Hybrid Annuity Model in Gujarat. The scope of work includes four-laning of Dhol-Bhadra Patiya section of NH-151A and Bhadra Patiya-Pipaliya section of the same highway.
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Railway secures all clearances for 508-km bullet train project

The Indian Railways has got all the requisite clearances in Gujarat and Maharashtra for the 508-km long Ahmedabad-Mumbai High-Speed Rail Corridor. Railway Board Chairman and CEO, V.K. Yadav, informed that of the 1,651 utilities, 1,070 have already been shifted for the High-Speed Train Corridor and the railways also got 67% of the land required for the Bullet train project.

DMRC-NMRC inks consultancy pact for new corridors

DMRC has agreed to provide consultation to the Noida Metro Rail Corporation (NMRC) for the expansion of Noida-Greater Noida metro corridor. NMRC already operates the Aqua Line over a 29.07-km distance between Noida and Greater Noida in Gautam Buddha Nagar in western UP and is planning a new 9-km corridor between the twin cities.

Nepal agrees to fast-track Kathmandu-India rail line

India and Nepal have agreed on the construction of a rail line from Kathmandu to the Indian mainland. The decision follows China's energetic effort to link the Nepalese capital with Tibet but with the newest deal, India has prevented China from bringing its railway, troops and equipment close to the Indian borders.

HCC in JV wins ₹236-cr rail contract in Northeast

Hindustan Construction Company Ltd. (HCC), in a joint venture with Vensar Constructions Company Limited (VCCL), has won ₹236 crore contracts in two separate projects from the Northeast Frontier Railway for the construction of Single Line BG Tunnels Lot 14A and Lot 15A on a 51.38 km long Bairabi-Sairang New BG Rail line in Manipur.

ADB approves $500-mn funds for metro corridors

The Asian Development Bank (ADB) has approved $500 million funds to construct two new metro rail lines in Bengaluru to augment an efficient and safe transportation system. The new metro corridors will mostly be elevated, with a total length of 56 km along Outer Ring Road and NH-44 between Central Silk Board and Kempewgoda International Airport.

Railway expedites work on ₹934-cr Yavatmal-Digras line

The construction work on the 79-km Yavatmal-Digras railway line, part of the long-pending Wardha-Yavatmal-Nanded line has been started at an investment of ₹934 crore. While the contract for earthwork of 32-km stretch, costing ₹486 crore, has been awarded to Patel Engineering, the remaining length of 47-km costing ₹448 crore, has been awarded to Shree Raj Rajeshwar Construction Company.

Ahmedabad-Rajkot bullet train link on anvil

Indian Railways has planned to build a new Ahmedabad-Rajkot Railway link allowing a seamless passage for high-speed trains and also connecting the Ahmedabad-Mumbai bullet train corridors. The Central Government has approved the project. Unlike Ahmedabad-Mumbai bullet train project, the new railway line will not just be a bullet train but also support a high-speed train in the state and allow passengers from Ahmedabad to reach Rajkot, or vice-versa, quickly.

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Eminent personalities will be invited to deliver lectures during the seminar. There will be a large participation by construction companies, structural consultants, decision makers from government agencies such as Bangalore Mahanagara Palike, Bangalore Metro, Bangalore Development Authority, CPWD, PWD, BWSSB, and KUIDFC, besides Academic Institutions, Research & Development organizations, and others.

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**L&T emerges as lowest bidder for 28 bridges on Bullet Train Corridor**

Larsen and Toubro (L&T)-IHI Infrastructure Systems Consortium has emerged as the lowest bidder for the procurement and fabrication of 28 steel bridges for crossing over lines, rivers, highways and other structures for the 508 km long Mumbai-Ahmedabad High Speed Rail (MAHSR) Project. NHSRCL spokesperson, Sushma Gaur, informed that an estimated 70,000 MT of steel will be used for the fabrication of these steel bridges and the Indian steel industry and allied supply chains will get a business boost. NHSRCL has already sensitized the steel industries to cater to such a huge demand for India’s first High-Speed Rail corridors.

**MMRDA expedites work on ₹1,276-cr flyover**

The construction work on the Sewri-Worli connector is expected to start soon as the MMRDA has finalized the contractor for the project involving an investment of ₹1,276-crore. The 4.5km flyover will connect the under-construction Mumbai Trans-Harbour Link (MTHL) with the Bandra-Worli Sea Link (BWSL) thereby reducing an hour’s travel time between the two points to just 10 minutes.

**Manglam Buildcon bags Noida flyover contract**

The Noida authority has awarded the contract for the Parthala Chowk flyover to Manglam Buildcon Limited and the contractor has to complete 697 metre-long flyover by the end of December next year at ₹80.53 crore. After commissioning, the flyover will provide seamless connectivity to thousands of commuters.

**NHAI unveils ₹1,300-cr Aroor-Thuravur elevated highway**

NHAI is all set to start construction work on the six-lane 15-km-long Aroor-Thuravur stretch on the 220-km Kozhikode (Ramanattukara)-Thuravur stretch that the nodal agency has decided to build at an investment of ₹1,300 crore in Kerala. The proposal was mooted by the NHAI considering the high cost of land acquisition on the stretch, which is heavily built up on either side.

**Gujarat approves ₹217-cr bridge on Mindhola Creek**

The Gujarat government has announced the approval of the construction of 2 km-long bridge on Mindhola Creek connecting Umbharat beach in Navsari's Jalalpore taluka with Abhava village in Surat entailing an investment of ₹217 crore. The project will boost the development of the Dream City project also housing the Surat Diamond Bourse (SDB) at Khajod, which is slated for completion in 2021.

**Udhampur-Baramulla rail line houses 97-km long tunnel**

Northern Railway has fast tracked the Udhampur-Srinagar-Baramulla rail line. It is to be completed in a phased manner by 2022 at an investment of ₹27,249 crore. Out of this 111-km section, 97-km-long line will be laid in a tunnel and it is a link project of J&K to Baramulla line. The most difficult part is the connectivity of Katra to Banihal as Katra has been connected from both sides and Banihal has connectivity till Baramulla. The project has engineering challenges but railway is reviewing its work on a regular basis.

**NIRMAANA 2021: International Hybrid Conference on Tunnelling & Underground Structures**

INSTRUCT (Institute for Research Development and Training of Construction Trades and Management), Bengaluru, has announced an international hybrid conference on ‘Tunnelling & Underground Structures’ on 22nd and 23rd July 2021 at NIMHANS Convention Centre, Hosur Road, Bangalore.

NIRMAANA 2021 will present a valuable opportunity for the infrastructure sector to interact and showcase their products and services, and to listen to the best minds in the industry sub-segments. With India planning to reach the US$ 5 trillion economy in the next 5 years, the Infrastructures sector, which attracted about 40% of total PE/VC investment in 2019, is expected to play a major role. The Government intends to spend about US$1.4 trillion in the next few years on Infrastructure development, with a clear focus on time bound creation of assets of world-class standards.

With India expected to be the 3rd largest construction market globally by 2022, there exists a tremendous requirement and the opportunity for trained personnel, mechanization, technology / knowledge transfer, and strengthening of existing supply chains in the tunnelling and underground infrastructure space. This conference aims to meet these key objectives by providing a platform to all the stakeholders, including academicians, practitioners, decision makers, and businesses in the industry, to come together for knowledge sharing and business networking opportunities. Experts from the industry sub-segments will share their thoughts and exchange information on the subject with participating companies and industry professionals.

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Real Estate

NBCC invites bids for building 30 towers along metro lines
NBCC has invited bids to develop 70 acres of land into a mix of commercial, residential and retail hubs housing 30 towers at a cost of ₹1,400 crore. The towers around Delhi Metro's Pink and Blue Line corridors will be developed in a phased manner where the winning bidder will carry out a detailed valuation of the east Delhi hub with the scope of work including master planning and construction.

Hiranandani Group launches ₹7,000-cr Data Centre Park
Hiranandani Group’s subsidiary, Yotta Infrastructure, has laid the foundation of 20-acre Delhi NCR Data Centre Park in Greater Noida involving an investment of about ₹7,000 crore. The park will consist of six interconnected data centre buildings, which will offer 30,000 racks capacity and require 200 MW of power.

Assam floats tender for twin towers worth ₹2,000-cr
The Assam Industrial Development Corporation has floated tender for the construction of twin towers at Basistha Chairali, Guwahati in Kamrup district involving an investment of ₹2,000 crore. The authority has earmarked about 10.6-acre of land for the project which is proposed to be developed as a mixed-use development equipped with all modern facilities.

L&T wins ₹2,500-cr multiple construction contracts
The Larsen & Toubro’s wholly-owned subsidiary, L&T Construction, has bagged multiple contracts of about ₹2,500 crore for its various businesses. The orders were secured in the Building & Factories (B&F) Business and Power Transmission & Distribution Business.

Ahuwalia Contracts secures ₹533-cr construction contract
Ahuwalia Contracts (India) has secured an order of around ₹533.90 crore for the redevelopment of Lokmanya Tilak Municipal General (LTMG) Hospital, Mumbai. It will redevelop F/N Ward of this public sector hospital and also construct the nursing college and RMO residence building, which is located behind the existing college building of the hospital at Sion. The total order inflow during the FY 2020-21 stands at ₹1777.04 crore.

MUDA plans to build 6,000 flats on ring road
Mysuru Urban Development Authority (MUDA) has decided to build 6,000 flats near the ring road. Commissioner, Natesh, informed that MUDA has identified three locations along the ring road for building apartments. The authority will build 2,000 houses at each location, consisting of single, two-bed and three-bedroom flats.

Dosti Realty launches new project in Mumbai
Dosti Realty has announced the launch of another spectacular landmark project, Dosti Eastern Bay at New Wadala in Mumbai metropolitan city. The project, which is ideally located at about 10 minutes drive from BKC and 15 minutes from Fort, has been designed by world-renowned architect and Padma Bhushan Award winner Hafeez Contractor.

IKEA gets 3,300 sq mt land parcel for commercial complex in Noida
IKEA is all set to start work on its store-cum-commercial complex in Noida, with the Authority finally agreeing to hand over 3,300 sqm land parcel adjacent to the company’s plot in Sector 51. The authority added a rider that IKEA will have to develop a rotary on the plot and keep it open for public use.

Ashwin Sheth in JV unveils ₹650-cr realty project in Nagpur
Real estate builder, Ashwin Sheth Group, has entered into a joint venture with Nagpur-based Sethi Group to develop 1 million sq ft mall at Viviana, Nagpur in the city’s south western region near Pratap Nagar. The entire project, which involves an investment of ₹650 crore, includes land’s valuation and construction cost.

L&T revisits ₹2,900-cr redevelopment project in Mumbai
Larsen & Toubro (L&T) has once again agreed to take up the Naigaum BDD Chawl redevelopment project involving an investment of ₹2,900 crore. The company withdrew its termination notice submitted to the chief officer, Mumbai Board, Yogesh Mhase, and agreed to resume the construction work again. State Housing minister, Jitendra Awhad, had been informed by the housing secretary that L&T had decided to unconditionally take up the project again.

Joyville announces ₹700-cr realty venture in Pune
Shapoorji Pallonji’s mid-income housing platform, Joyville, has announced the construction of a new housing project with over 1,100 flats in Pune. It is the sixth project of Joyville and third in the Pune property market. Joyville is a $200-million platform by Shapoorji Pallonji Group, ADB, IFC and Actis to jointly develop housing projects in India.
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Though the construction industry, the second largest contributor to GDP, plays a significant role in the country’s economic growth, yet it faces several challenges in realizing its full potential. The Covid-19 pandemic has further compounded the challenges, particularly the ones related to finance and labour. Over the recent years, the Construction Industry has made significant strides. Even more recently, in 2018, it regained its growth momentum with the output expanding by 8.8% in real terms. This was made possible by positive developments in economic conditions, and scaling up of investments in housing, transport infra and energy. In 2018, residential construction accounted for 30.6%, followed by energy utilization (27.1%), infra construction (23.3%), industrial construction (7.8%), commercial (7.6%), and institutional (3.6%). Today, there are a large number of private companies engaged in construction and even public-private partnerships are boosting construction activities for urban development.

Riding high on reforms and positive policy interventions, India’s Construction Industry was projected to become the third largest in the world, after China and America. The real estate and construction sector, which was valued at $126 billion in 2016, is expected to increase 7-fold by 2028. However, due to large scale disruption caused by Covid-19, their fortunes have been adversely impacted, with the survival of many companies at stake.

Even before the pandemic, the Construction Industry, being highly fragmented with a limited number of large companies and numerous small and medium sized sub-contractors, was seeing several companies going bust due to multiple challenges. These included capital crunch, time and cost overruns, shortage of skilled labour, inadequate project management, difficulty in land acquisition, fluctuating raw material prices, supply chain bottlenecks, poor cash flow planning, slow technology adoption, poor contract and stakeholder management, and flawed corporate governance leading to corruption and pilferage.

The ongoing stress and turmoil in the Middle East with the leading global construction company Arabtec shows that with the lowest price competitive tendering, inequitable risk allocation, low profit margins, uncertain pipeline, and late payments, can bring down the construction industry. A combination of internal and external factors is responsible for the plight. The biggest bane of the Construction Industry, according to Vikram Hosangady, Partner, KPMG, is its fragmented nature and the family-run businesses which have poor corporate governance and the inability to deal with either opportunities or threats. Weak corporate governance is responsible for creating management related challenges. “Lack of broad basing of management, especially with regard to functions like Finance, IT and R&D has a lot to do with companies failing,” adds Hosangady. The absence of a smooth transition plan not only results in the loss of management talent and investor confidence, but also leads to failure of companies. Experts say that due to the fragmented nature of the industry, the collapse of a big company affects many sub-contractors.

Nimish Gupta, MD, South Asia, RICS, a global professional body for qualifications and standards in land, property and construction, is of the opinion that the problem of construction companies starts with flawed bidding of projects; and not sticking to the principles of projects and cost control. “With no proper planning and estimates in place, multiple projects and contractors experience severe losses and have to face serious cash flow challenges. Failure to establish a proper supply chain mechanism in the initial stages leads to poor decision making and a disadvantageous position for the contractors.”
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According to Rishabh Sawansukha of Biz Street, a strategic business consultancy, an unsustainable business model lacking proper organizational and financial planning leads to failure of many companies. Moreover, considering that construction is a cost-intensive business, poorly planned cash flows for a project and liquidity crunch will affect the overall project performance parameters, leading to financial, legal and relationship challenges. The expansion of companies beyond their capacity adds to their woes. “The capacity to manage large projects comes with time and experience, which is often ignored, and companies keep expanding beyond their capacity. This eventually results in falling short of expectations and delivery deadlines,” says Nimish Gupta.

How serious is this problem of delivery defaults by construction companies is evident from the latest statistics released by the Ministry of Statistics and Programme Implementation. As many as 412 infra projects have cost overruns of ₹4.11 lakh crore. “The average time overrun is 43.34 months and maximum time overrun is more than 60 months. The time and cost overruns affect the performance parameters,” says Gupta.

The delivery defaults (cost & time overruns) are due to companies facing execution capabilities. Capital crunch is another big challenge for project execution. Due to land cost escalation, construction projects became too expensive. “Further, the diversion of funds to other businesses and for personal gains of the promoters has not only adversely impacted project execution but also contributed to the downfall of many companies,” says Ambrish Parajiya, Director, GAP Associates, a construction infra development company.

According to Sawansukha, diversion of funds and pillages by the companies into liquidation have been posing a further challenge to the Construction Industry’s growth. The current pandemic has further exacerbated the woes of the construction companies. “Since April, many construction sites across the country are still not operational at full capacity. Labour shortage coupled with social distancing norms are adversely impacting the operations of construction companies. Capital crunch is another big spoiler,” says Anuj Puri, Founder & Chairman, Anarock Property Consultants.

Today, digitization can play a big role in efficient project management, resulting in cost reduction and quality and timely delivery of projects. “This is the best time to explore technology for digital transformation of the construction business and to tackle post-Covid challenges,” says Sripad Nandiraj, Founder, Hocomoco, a technology-based construction company, and adds that new-age technologies should synchronize with the entire ecosystem by digitizing project management, automated project scheduling, material planning and e-monitoring.

Affirms Anuj Puri, “Construction companies need to adapt new-age technological advancements like cost automation, sustainability, use of pre-fab materials, etc. Nagpur Metro Rail Corporation has successfully adopted 5D BIM technology for practical completion of the project and create Issue Based Information System (IBIS) for each phase of the project. In Amritsar, the Rapid Transit System was constructed using Virtual Design and Construction Technology. It is one of the first examples of the use of BIM technology in India.

Nimish Gupta also endorses a virtual construction programme like BIM for organized execution of a project to envisage the risks and to develop more efficient, sustainable and cost-effective solutions. Gupta lists a few measures for construction companies in order to tackle the challenges. “A construction business should always have a robust risk management system for both the project and the organization. The absence of such a system has been seen to create problems in meeting contractual obligations with respect to time, cost, quality, health and safety of the project.” He adds that poor contract management, an overly risk-averse approach by the client, and transference of entire risks to the contractor leads to conflicts. Furthermore, the absence of a dispute avoidance/ resolution mechanism, precipitates matters. Due to poor stakeholder management, a contractor gets sandwiched between the client’s over expectations and unwillingness to pay the right price. This leads to strained relationship between the client and contractor, and the resultant disputes lead to prolonged legal battles.

The government too needs to play an active role by way of enforcing policies that help construction companies survive tough times. In a recent relief, the government has put into effect a reduction in the performance security amount from the current 5-10% of a project cost to only 3%. Construction companies will now have to pay less upfront for a project and they will have more cash flow to carry out construction. The government through several stimuli has also tried to meet the capital needs of the construction companies, especially SMEs. “However, the disbursals need to be expedited. Moreover, banks and lending institutions are still wary of lending. This, together with the issues relating to wavering cost of raw materials, and shortage of skilled labour, needs to be tackled urgently to minimize the current impact of the pandemic,” says Anuj Puri.

Adds Sawansukha, “The government should reduce the capital cost and construction companies should be allowed to float IPOs through international finance centres. The hyper inflationary land pricing should be checked. Land should be made available for development along with rail, road, and water grids by the government. Taxation should not impact cash flows, and stages of growth and financing should be aligned with taxation. Old arbitration matters should be sorted out to unlock cash flow. There should be an effective dispute resolution with focus on mediation.”

The writer is Editor, PropTOQ, a real estate magazine.
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Tunnel construction in the country has picked up pace in the past four-five years on account of an increased number of projects involving longer tunnel lengths, and in some of the world’s most difficult terrain conditions. The scope of tunnel projects is also expanding as a result of growing urbanisation and the rising demand for better infrastructure. While the railway sector was the first to undertake tunnel development, the maximum number of tunnels have been developed in the hydropower sector. Tunnels for supply of water received a boost with the launch of programs such as the Jawaharlal Nehru National Urban Renewal Mission, the Pradhan Mantri Krishi Sinchayee Yojana, and the Interlinking of Rivers program for India’s Tunnelling Industry

Opportunities & Challenges

The growth of the tunnel construction in the country has been driven by a robust pipeline of projects and investments in setting up hydropower projects, developing urban mass rapid transit systems, improving road and rail connectivity, constructing underground crude oil storage, and upgrading water supply and sewerage systems.

Sunil Sharma, Chief Manager – Technical, Tunnelling Association of India

There is currently a pipeline of 1641 tunnels spanning 3445 km, in various stages of development - either completed, under implementation, awarded, under bidding, announced, approved, planned/proposed or stalled. Of these, 77 per cent have been completed; 20 per cent are under construction; and the remaining 3 per cent have been recently awarded. About 280 tunnels spanning a length of over 890 km, are targeted for completion by 2021-22, and 137 tunnels (spanning over 630 km) with long gestation periods, are expected to be completed by 2026. Huge investments in infrastructure development across various segments will give a push to tunnel construction. The railways’ capex target for 2018-19 is an all-time high of ₹1.48 trillion; hydropower capacity is expected to increase by 13 GW in the next five to six years; and around 10% of the upcoming length of metro rail projects is planned as underground. Apart from these, the Bharatmala, Chardham Connectivity, AMRUT, and the Smart Cities Mission will offer ample opportunities to tunnel contractors, consultants, equipment manufacturers, and technology providers.
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Hydro tunnels account for the largest share, followed by railways, irrigation, metro rail, water supply, sewerage, roads and highways. One of the vital projects of this sector is the Upper Siang hydropower project in Arunachal Pradesh which involves construction of 30 tunnels in a horseshoe-shape; it is the most prominent tunnel design in hydropower projects across India. Other key tunnel projects in the hydro sector include Dibang, Sawalkote, and Subhanshri Middle hydroelectric projects - all of which will be constructed in the horseshoe shape.

Currently, many landmark and challenging highway tunnel projects in hilly areas are under various stages of planning and execution. These include the 14-km Zojila tunnel, 9-km Rohtang tunnel on the Leh-Manali highway, 11.55-km tunnel on the Jiribam Tupul-ImpHAL rail line, 4.5-km Char Dham tunnel, and the recently announced Sela Nechiphu Pass tunnel. An immersed tunnel under Brahmaputra is also in the offing. Important tunnels such as the Chenani-Nashri road tunnel, the Banihal-Quazigund rail tunnel, the Kashang hydro tunnel, Teesta 3 and Kishanganga Hydroelectric Power, have been commissioned while several have been completed for metro projects in Delhi, Kolkata, Chennai, Lucknow etc.

Other landmark and challenging tunnel construction projects under execution include the Katra-Banihal railway line in Jammu & Kashmir (with a total length of 163 km), the Kaleshwaram Lift Irrigation Scheme (total length of 203 km), the 33.5 km Mumbai Metro Line 3, and the 7 km undersea tunnel of the Mumbai-Ahmedabad high-speed rail project.

**Tunnelling Equipment, Techniques & Methods**

The Indian industry is beginning to use modern technology for tunnel construction, and there is now greater room for adoption of international standards in tunnel design and construction. There is a demand for high-tech tunnelling equipment as geological complexities are the biggest challenge in tunnelling, more so in the Himalayan region and the Western Ghats. Soil and rock investigation, analysis of ground behaviour during tunnelling, and assessment of the risks, are important considerations. While the conventional drill and blasts techniques were more prevalent in the past, mechanized methods such as TBMs and NATMs are being used more and more.

Contractors are also experimenting with new techniques and methodologies such as the P5 system, sequential excavation systems, and ground freezing for the more geological challenging/special projects and are using innovative materials such as fibre bolts, fibre reinforced shotcrete, lattice girders, lining stress controllers, pipe-roof pre-support systems, geo-synthetics, geo-membranes, steel anchors and self-drilling rock bolts etc. to improve the durability and strength of the tunnels.

Tunnel boring machines (TBMs), including earth pressure balancing machines, slurry machines and shield machines, and New Austrian Tunneling Method (NATM) are gaining traction in urban areas. Another advanced method which is seeing increasing acceptance is micro-tunnelling for laying deep water supply and sewer lines in areas where open cut tunnelling is not feasible due to existing surface utilities.

However, conventional techniques such as the drill and blast method (DBM) continue to play a dominant role in the execution of tunnel construction projects. In over 38 per cent of hydro tunnel works the DBM will continue to be preferred. The rails and roads will move towards the advanced NATM - an
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Tunnelling – Overview

Observational method that takes a design-as-you-go approach – with use of software for predicting the oncoming geology based on deformation and other observations of measurements obtained during monitoring of the excavation. With NATM, the scope for software for automation and monitoring accessories has become huge.

As regards equipment, there is an increased demand for high-tech equipment as geological complexities and the ever-increasing need for faster paced work. Typically, about 25-30% of the tunnel construction cost is invested in procuring equipment and machinery. Over the next 3-4 years, about Rs. 1170 billion will be spent on procuring equipment and machinery for upcoming tunnel projects (cost will vary depending on the type of tunnelling method deployed, geological conditions, and level of technological advancements).

TBMs, EPBMs and slurry machines will continue to dominate the metro, irrigation and water supply tunnelling projects with a share of 24 per cent. Considering that the number of hydro projects using TBMs have stalled, there will be higher demand for simple equipment like drilling jumbos, excavators, loaders, cranes, forklifts, conveyors etc. With the use of mechanised methods like TBMs and NATM for tunnelling in congested urban spaces, demand for equipment such as cutter heads, shield machines, augers, arch lining gantry, pressure transducers, hydraulic filters, etc. will increase. Meanwhile, navigation systems, computerised jumbos and advanced drilling systems are being deployed for precision and better monitoring.

Issues & Roadblocks

The tunnelling segment continues to struggle with the following issues:

• **Geological complexities:** Geologic surprises are one of the biggest challenges. Complexities in the Himalayan region such as difficult terrains, thrust zones, shear zones, lack of mapping of in-situ stresses, high rock cover, ingress of water or gases, geothermal gradient, high level of seismicity etc. affect tunnelling activity.

• **Inadequate investigations:** Despite the availability of expert agencies in the country, there is usually an insufficient budget allocated for thorough investigations and less time given for site surveys and geological-geotechnical investigation affect tunnelling activities. Inadequate investigations lead to high risk in contractual costs.

• **Mismanaged contracts:** Ambiguity in the design of construction contracts affects the progress of tunnel construction. Any deficiency in the existing contract documents, and lack of risk sharing mechanisms lead to botched post contract practices.

• **Risk management:** Higher safety risks and inadequate safety measures are the other challenges in tunnel construction.

• **Health and safety risk issues:** Inadequate ventilation during construction of long tunnels and insufficient safety measures (in case of sudden ingress of water), will affect the construction progress.

• **Other issues:** Environmental impact, need for skilled manpower for manning and maintaining the sophisticated equipment, equipment related issues, opposition from local population during land acquisition.

These risks and challenges may increase or decrease as per the geology of the project, its location, the developer, contractor, and the contracting terms and conditions. There can be considerable time and cost overruns if the necessary attention is not paid during the
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Tunnelling – Overview

pre-construction phase, especially during geological investigations, and in defining the risks under the terms and conditions in the contract. Any neglect at this stage can have grave consequences, including abandonment or stalling of the project.

Risks & Challenges During Tunnelling

Tunnel risks and challenges are often associated with unpredictable soil and groundwater conditions, difficult environments, rocks of various types, which may traverse zones of various complexities. Risk events are often interrelated; there can be untoward incidents such as fire, landslide, and flooding, which will lead to delays, environmental impact, and cost overruns, and there is a possible risk of damage to the surrounding properties and persons, especially in dense cities and towns.

To mitigate risks, tunnel projects should be conceptualized and planned systematically to ensure smooth implementation; adequate investigations carried out, proper selection of tunnelling equipment made, appropriate contracting practices documented, statutory clearances taken, competent construction subcontractors deployed, and social issues duly considered. Every tunnelling project, from its conception to commissioning, is influenced by the geology of the area, so, reliability of the predicted geology is important. Some projects are primarily schedule driven, while others are cost or quality driven. Whether a specific risk event is perceived fundamentally as a cost risk or a schedule risk is governed by the project-specific context.

All these challenges may result in increased cost and extended completion period. So, one must carefully consider the likelihood of a risk occurrence and its impact in the context of a specific set of project conditions and circumstances. Herein lies the challenge between failure and success.

Tunnelling Opportunities

India is one of the fastest growing markets for tunnel construction, with the tunnelling industry witnessing high growth and ready to adopt advanced technologies. It is estimated that over Rs. 5.00 trillion worth of projects will be awarded in the next five years. Over the past few years, the size of tunnelling projects has witnessed a substantial increase. Almost all the upcoming tunnel projects are of longer lengths, larger diameters, and even higher contract values. Rising investments in tunnel construction have resulted in high growth in the tunnel equipment market as well. Going forward, as the pressure on land increases for productive economic and social uses, there will be greater need to construct underground structures in the metro, water and sewerage, and road sectors.

Tunnelling infrastructure holds immense promise for contractors, consultants, technology and equipment providers, material suppliers etc. over the long term. With more industry players tying up with international players, either for risk assessment, design or construction technology, the industry will witness reduced risks in project construction and timely completion.

TERRATEC TBMs breakthrough on Pune Metro

Maharashtra Metro Rail Corp and GuElMak-TATA Projects joint venture recently celebrated the breakthrough of a 6.61m-diameter Terratec earth pressure balance (EPB) TBM (Mula) for excavating the 16.56-km Line 1 (Purple Line) of the Pune metro in Maharashtra.

With the holing through at Civil Court underground station seen as a milestone, the joint venture has now completed twin-tube tunnels between the start of the ramp at chainage 10,950 and the NATM section at the start of Civil Court Station (12,600) - a total of 1,650m of TBM tunnelling.

TBM ‘Mula’ (S79) is one of three Terratec EPB machines excavating the line; another is the 6.61m-diameter S78 TBM (‘Mutha’) which broke through in September at the 155m NATM scissor crossover at Civil Court Station, having been launched from near the College of Agriculture at the end of 2019. Both machines have excavated in hard rock beneath a densely populated area, complicated by lockdown restrictions, which saw a best monthly progress of 301m. Terratec’s field service team was on site to support the effort.

In 2019, Maharashtra Metro Rail Corp (MahaMetro) announced that the JV had won both the twin-tube tunnel packages on the new 16.56km-long north-south metro corridor. The 5-km underground section – which runs from the College of Agriculture in Shivajinagar to Swargate and has five stations – is considered the most challenging section of the line, as it passes under the densely populated areas of Kasba Peth, Budhwar Peth and Mandai market.

The Terratec EPBMs have mixed-face, dome-style cutterheads designed to work effectively in the dense basalt that is expected, with pressures up to four bar. As the TBMs progress, they will install 1,400mm by 275mm-thick precast concrete lining segments in a five-plus-key configuration.
Fresh from delivering Malaysia’s first metro with great success, tunnelling contractor MMC Gamuda KVMRT (T) (MGKT - a joint venture between MMC and Gamuda Berhad in which Gamuda Engineering is its subsidiary) has recently celebrated the completion of its tunnels on Putrajaya line; it is the second extension to the Klang Valley Mass Rapid Transit. The scope of work includes 13.5-km of twin bored tunnel (internal diameter of 5.8-m), 11 underground stations, and other ancillary structures. A total of 12 tunnel boring machines (TBMs) were deployed, out of which 8 were variable density TBMs, and 4 were Earth Pressure Balance TBMs.

At first glance, there are many striking facts about the project. The alignment falls within some of the capital city’s most prime locations, crossing high density neighbourhoods, high-rise buildings, and public infrastructures. What’s more, the geological profile of the region is heterogeneous, further complicating the mining and deep excavation works required for the shafts. The geology includes Kenny Hill formation and Kuala Lumpur limestone—similar to that of the previous job—plus a particularly abrasive granite region, new to the tunnellers this time around.

Considering that the varying geology itself poses a risk to tunnelling, a risk mitigation drive was established from the very beginning, where extensive ground treatment works, constant monitoring and use of innovative solutions (paired with the contractor’s intimate understanding of the ground gathered from their earlier experiences) were aligned to shape the success of the project.

Continued success of the Variable Density Tunnel Boring Machine

A common thread to the success of the KVMRT projects is the award-winning VD TBMs. Developed jointly with Herrenknecht to specifically address Kuala Lumpur’s Extreme V karstic limestone, the VD machine continued to prove its versatility and efficacy in the second line. In one instance where a particular 1.7 km-stretch crossed two distinct grounds, the tunnellers switched from Earth Pressure Balance mode to Slurry mode in a single VD machine with ease as they navigated from alluvium soil into mixed ground conditions of limestone and Kenny.
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Hill alluvium. In contrast, a conventional method would have required more shafts to be built and more machines deployed to complete the job.

Says Ng Hau Wei, Head of Tunnels, Gamuda Engineering, “With the VD TBM, we could switch between multiple slurry and EPB modes with ease in a single drive. With the ATBM system, the possibilities are endless as we now have supervision over tunnelling parameters and operations for multiple machines simultaneously, at the speed and accuracy of a computer.”

World’s first Autonomous Tunnel Boring Machine

MGKT continued to push the envelope in pursuing tunnelling technologies, ultimately launching the world’s first autonomous tunnel boring machine. A shared vision of its leaders, the ATBM aspires to achieve a level of automation and digitalisation that will make tunnelling operations simpler and safer.

Typically, tunnelling operations tend to be labour intensive while, at the same time requiring attention to thousands of data points in real time. Seeing that there were plenty of avenues to modernise the sub systems of a TBM (steering, excavating, etc), MGKT developed a control algorithm that aggregates and analyses these data to deliver superior performance with faster response times, unbiased decision making and improved accuracies, resulting in overall safer operations.

A large impetus behind the development was the shortage of mechanised tunnelling expertise in the local scene. With the ATBM, a world of possibilities has been opened up, reducing the menial and manual aspects of the job and elevating precious manpower into higher level tasks and oversight. By extension, a Tunnelling Command and Control Centre (TC4) was set up, where tunnellers can now monitor multiple TBMs remotely, thus enhancing communication and collaboration. The ATBM has been recognised by the New Civil Engineer society and International Tunnelling and Underground Space Association for its ground-breaking potential and has proven itself with over 9-km of tunnel successfully built in the Putrajaya line.

Project-wide Digital Transformation

In fact, a distinct feature of the project is the strategic roll-out of digitalisation initiatives unlike any before in Malaysian construction. In view of the overwhelmingly large volume of information transaction and construction activities happening daily across 17 construction sites, involving hundreds of staff, consultants, subcontractors and players, it only makes sense to wield the benefits of technology to streamline all
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- Cable or Radio remote control
workflows. Some examples of MGKT’s in-house solutions are:

The Project GIS (Geographic Information System) Portal: A web-based platform that grants a bird’s eye view of project site survey models. These surveys were developed using drone-captured photographs pinned with GIS applications. The Portal strengthens and informs decision-making processes by providing visualisation of these sites in their localities, granting context and a sense of proportionality. Even staff based overseas are now able to review site activities virtually and identify potential construction or temporary work-related issues in a timely manner, via the Portal.

Viewpoint Field View™: A common data environment database that has taken field documentations for quality, safe, project delivery, closeouts and commissioning unto a Cloud, while simply using offline based mobile applications for input. Field View enables easy tracking, access and sharing of large quantities of project documents, ultimately offering the benefits of data analytics and security to boost project synergy.

BIMAR (Augmented Reality in Building Information Modelling): An AR application for site inspection that allows real-world visualisation of 3D building designs through a mobile device. A first such in the industry, the app was developed in-house using Unity and Apple software development kits. A crucial key to the success of BIMAR is the accurate Building Information Modelling (BIM) renderings established early in the project and hosted on a reliable Cloud system. These were, in fact, BIM Level 2 certified from the British Research Establishment, a rare achievement from a contractor’s standpoint. BIMAR has radically enhanced the quality and safety aspects of overall operations with interactive and tangible means of visualisation, thus enhancing cross-collaboration and yielding efficient and meaningful outcomes to the business.

Success Despite Unforeseen Circumstances

It is noteworthy that these grassroot initiatives were successfully rolled out despite a chain of national affairs that had impacted the mega infrastructure project to a great extent. In late 2018, at almost halfway through the construction progress, an austerity drive by a newly elected government led to a change in the overall KVMRT project cost and contract. The project budget was slashed by 8.82 billion Malaysian Ringgit and converted into a turnkey model, resulting in major shifts in the organisational structure and work scope. Some of the major modifications affecting the underground section include the deferred opening of two stations (which were converted into shell and core stations), and rationalisation of architectural, electrical, and mechanical system works.

Another unforeseen incident was the onset of the Coronavirus-19 pandemic. When the country went into lockdown, 8 TBM's were already mining underground. To safeguard staff and workers well-being, numerous control measures and reconfiguration (both at worker’s residential and working spaces) were swiftly devised and implemented to allow essential construction works to proceed. Considering the far-reaching impact of these incidents (to name a few), on the project and its people, it is no mean feat for MGKT to deliver the tunnel completion with no compromise in safety, quality or schedule.

The entire Putrajaya Line is on track for full opening by January 2023, and Gamuda Engineering is ready to move on to other complex tunnelling projects, be it in Malaysia or elsewhere. Says Gusztáv Klados, a leading tunnel specialist with up to 50 years of industry experience, describes the phenomenal growth of GE with whom he has been with for almost 20 years. “Once we were awarded the construction of Line One (Kajang line) tunnels, we had to build on the capabilities of the people who were with the company and nurture local knowledge and talent. In fact, it is with such capabilities and commitment to the task, that the VD TBM, was developed to tackle the challenging geology of the Kajang line. Our technical knowledge is convertible ... there will be other places where we have an opportunity, and we will have a good chance of getting jobs.”

Contributed by Joyce Shamini Rajendran, Specialist Writer at MGKT
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A tunnelling project is a race against time and costs. Getting it right from the very beginning requires knowledge, skill and experience, as well as a proper range of equipment that fulfils the customer’s tunnelling requirement. Sandvik has been giving drilling solutions for more than 50 years, by creating cutting-edge technology that meet the needs of modern-day tunnelling.

Sandvik 800 series DT821C is a twin boom electrohydraulic semi-automatic tunnelling Jumbo that offers the right solution for any tunnelling application like face drilling, bolt hole drilling, and mechanized long-hole drilling. It provides efficiency and accuracy along with reliable performance.

The fast and user-friendly Jumbo produces excavation results of the highest quality and with the lowest costs. Its hydraulic rigs-controlled systems with advanced automatic functions include MWD (Measure While Drilling) data collection and hole length control system as per the drill plan.

Advanced Intelligence
To produce the highest repeatability and the best possible excavation predictability, the DT821C is loaded with Sandvik T-CAD+ and iSURE® 8.0, a revolutionary tunnel management tool, which offers an efficient way of designing blasting and drilling pattern. The iSURE® ensures accurate drilling and optimized blasting according to plan that gives better pull-out, significant reduction in scaling costs, better mucking efficiency, and smoother collaring in the following round.

iSURE® uses the most critical spot, the blast plane, as the basis for the whole planning process. As the drill plan is implemented to fit the blasting plane, the hole bottom spacing and the burdens will be adjusted accordingly; the used charge defined and the cracking zone examined. As a result, hole locations and blasting are optimized. A range of practical features will allow the operator to fine-tune the process online, depending on the rock conditions.

Efficiency and Accuracy
The drilling speed and exceptional accuracy of the Sandvik DT821C Jumbo stems from the combination of high-performance RD520 / RD525 rock drills, robust booms, advanced drill string guides, and an advanced control system. Accurate positioning using any navigation methods and precision in drilling maximizes the round performance because of significant reduction in over-breaks / under-breaks. This leads to direct savings in the costs of additional spraying or secondary blasting.

Control system and Instrumentation
The control system on Sandvik DT821C offers a wide range of practical features which greatly improve the drilling accuracy and performance. Features include an automatic percussion feed control that optimizes drilling pressure level with the pre-set limit values, hinders over and underfeeding, and enhances the life of rock tools and the rock drill.

The noise and vibration insulated FOPS cabin loaded with a high level of instrumentation, provides ergonomic and extremely comfortable working place with excellent visibility. The operator makes a smooth ride on the DT821C even when working in the toughest of terrains.

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German manufacturer GHH brings special Shotcreting Machine to help complete Mumbai Nagpur Expressway

The Mumbai-Nagpur Expressway is delayed until 2022. In the meantime, a machine ‘GHH IS26’ with remarkable reliability has been specially flown in from the supplier and is in operation to help complete the project to meet the new timeline.

The Expressway, also known as the Maharashtra Samruddhi Mahamarg, is eagerly awaited. Eight lanes of over 701 km would connect the two metropolises of Mumbai and Nagpur. The travel time would be reduced from about 18 hours to 8 hours, which means that the: travellers would effectively save a whole day.

While Mumbai is considered the most important port city on the subcontinent, Nagpur is not only the geographical centre of India, but also a major industrial hub. It is assumed that the new expressway would have an impact on the economic power of the whole of western India.

Expressway expected to open in May 2022

The ambitious project that started in 2016 was facing delays even before the Covid-19 pandemic which has further aggravated the situation. It is now expected that the Expressway will open for traffic in May 2022.

The overall project is divided into 16 sections, three of which are planned with tunnels. Tunnelling plays a key role in the timely completion of the project as this is where delays generally occur due to technical or geological imponderables. To ensure that the new timeline does not fall into disarray, the reins have been tightened in many places.

IS26 from GHH has 98 percent operational availability

A special machine was ordered from the German manufacturer GHH for this demanding sub-discipline. It is currently in use on the 520 km long main section
between Nagpur and Shirdi, which is scheduled for completion in May 2021. The workers use it to apply the shotcrete to the tunnel walls.

The investment in this machine has probably already paid off: Unlike other heavy construction equipment, the IS26 from GHH has an availability rate of over 98 per cent, calculated over a period of more than half a year. By mid-December 2020, it had already applied more than 3,500 m$^3$ of shotcrete.

Small footprint, big impact

The IS26 is extremely compact and can also optimally line hard-to-reach places on the tunnel wall with concrete. For this purpose, it has an articulated arm instead of a rigid boom. This is an important argument for safety later on, in the finished tunnel. The boom allows a spraying range of up to 15 m vertically and 10.5 m horizontally. The spray head can rotate 360 degrees. The machine was built for tunnel cross-sections from 16 to 130 m$^2$. It has an all-wheel drive, equipped with four-wheel steering, and has a ROPS & FOPS Level II certified cabin with a high level of safety reserve for the driver. The driver’s job is easy because he can not only turn the seat 180 degrees, but also control the machine remotely.

It is now hoped that the project’s completion will not be delayed any further, as no difficulty is being foreseen in further operation of the GHH machine. GHH has been available for answering any queries regarding the machine and has extended all the support, including supply of spare parts at the site. The company’s engineers would like to be there when the line is put into operation. The German machine, combined with Indian craftsmanship and passion, should get the job done.
CRCHI’s EPB TBM ‘Victory’ Achieves New Records in Construction of Moscow Metro

Project overview
The project, located at the riverside of the Moscow River, passes under heavy traffic and crowded buildings. It includes two sections of a total length of 2947m. One is from Maple Avenue Station to No.2 Working Shaft; the other is from Maple Avenue Station to Nagaginsky Station.

Construction key points
The EPB TBM required excavation in an extremely cold environment of -35°C and faced many difficulties like small curve turning of 400 m, 40% large gradient, and long-distance excavation in shallow overburden. In addition, the machine bored 600 m under the Moscow River; the minimum overburden being 12 m.

Innovations in the TBM
• The EPB TBM is designed to have a heavy-duty composite cutterhead and a high-power drive system, which enables the machine to tunnel safely and reliably in the complex geologies for a long distance.
• For avoiding formation of mud cakes during drive, a big muck inlet is placed at the center of the cutterhead, and several flushing pipelines of conditioning agents are equipped, which helps to improve the plastic fluidity of the muck.

Project: Eastern Section of Moscow Third Interchange Circuit
Location: Moscow, Russia
Machine data: Its diameter is 10.88 m, and total weight is 1700 t.
Contractor: China Railway Construction International, CRCC 16 Bureau Group

• For avoiding occurrence of ground settlement and grout leaking, the TBM is equipped with an all-around grouting system.
• For solving the problem of mega-sized TBMs to tunnel along small curved turnings, the EPB TBM is designed to have an articulation system, copy cutter bits and a thrust system with floating support.
• In response to the extremely cold climate, the EPB TBM has a low temperature resistance design which enables normal excavation in the environment of -35°C.

Construction performance
True to its name ‘Victory’, named by Marat Khusnullin, former Deputy Moscow Mayor, the EPB TBM achieved a national record of 433.8 m in one month in Russia.
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Epiroc: Tunneling Opportunities on the Rise

What are the major tunneling jobs in a metal mine and what are the equipment required?

For tunneling in an underground metal mine, the first job when you open the portal is to drive the decline or incline, which is done to reach the ore body. Once the ore body has been reached, you develop the ore body based on your underground mining methodology, which will depend on various factors such as size and width of the ore body. So, you have to develop the levels, sub-levels, crosscuts and other structures.

For the equipment required, you need to start with face drills (boomers), and you will need low profile dump trucks and load haul dump (LHD). The LHD will take the muck and dump it into the trucks, which will take it outside the mine to the ore passes and dump it. Through the ore passes, the muck goes to crushers, and then needs to be evacuated through the LPDT etc. In a nutshell, the basic tunneling activity in underground metal mining involves development of a ramp, levels and sub-levels, stock phases, crosscuts, and other structures.

What equipment and solutions does Epiroc offer for tunneling jobs?

Epiroc offers ground-breaking technologies and innovative, safe, and sustainable construction equipment and tools for the mining and infrastructure industries. It also provides world-class services and solutions for automation and interoperability during tunneling. Epiroc’s Underground Division develops, manufactures, and markets

Anirban Sen, Underground Business Manager Asia Pacific & India, Epiroc Mining, shares information on the tunneling challenges in mines and the equipment required, and why the company is optimistic of demand rising for tunneling equipment.
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a wide range of tunneling and mining equipment, including drill rigs, loaders, mine trucks and ventilation systems, for applications worldwide, besides innovative product design and aftermarket support systems for added customer value. The division’s production facilities are in Sweden, India, and China.

Epiroc has various types of boomers - both for mining and civil works - from single-boom to four-boom, besides bolting machines, LHDs ranging from 4 to 18 tons, and low-profile dump trucks from 20 to 65 tons. Our tunneling machines are also used in underground drilling for civil construction of roads and railway tunnels, hydropower projects, and in many other applications. Our machines are working in India and globally in many underground heavy civil projects.

What are the key challenges in tunneling?

The first major challenge is the geology. If the geology does not support your underground tunneling methodology, then there can be accidents during civil construction and underground mining.

So, we need to first assess the geology and the nature of the rocks. If you know the geology well, then you can plan your support program accordingly, like what kind of bolts you will need, whether you need to go for shotcreting, and check for any other problems.

For civil construction, land acquisition is a major challenge. For instance, when you are constructing a dam, you are displacing a lot of land and people, which are socio-ecological challenges. Availability of experts is another challenge since in India, you may have the people in big numbers but there is a dearth of trained people and experts in the field. Plus, proper training of the operation and maintenance crew is required.

Underground mining is a capital-intensive project, and you need to have deep pockets to start such a project, because even if you start the mine, you may get the ore after 3-4 years of operations, which means that during the first 3-4 years of mine development, you are not earning anything. Thus, sustainability with respect to finance is important.

What are the safety measures for tunneling?

For mining, there are regulations such as DGMS in India, while globally, there is the stringent US regulation of MSHA. Generally, emission levels also need to be controlled during mining and the ventilation has to be good. Machines should have safety features like the standard FOPS and ROPS canopies/cabins for operator safety. The sound level inside the cabin/canopy should be equal to or lower than the permissible level. Operators should use proper PPEs while operating the machines.

Epiroc machines, which are being supplied not only in India, but also in global markets, are well equipped with the necessary safety features as per the standard, sometimes even better than the standard.

What is the current demand for tunneling equipment?

The demand for tunneling machines has started picking up with many civil projects coming up in the country. The government is investing heavily in border road projects like the Atal Tunnel, and the Zojila tunnel project has also been started. The Char Dham project of RVNL is going on, and some hydropower projects have been planned.

In the mining sector, our customers have invested in equipment and automation for their operations, taking forward the concept of ‘mine of the future’. We are discussing with them the requirement of equipment for other mineral operations too. Some mining companies are also planning to modernize their old equipment. All these are opportunities in the making for tunneling equipment players.
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While 2020 has been an unprecedented year globally, it has been able to create certain unique opportunities for the Real Estate sector that are likely to usher in a new era of innovation and digital transformation going forward. The Covid-19 pandemic has necessitated recalibration at a systemic and individual level, including the Real Estate sector, which has shown remarkable resilience in the face of the pandemic. The year 2021 would require us to reimagine the way we have operated so far. Below is a lowdown on how the Real Estate story unfolded in 2020:

**Office:** Quarterly growth was up by 14% from Q2 2020 – Q3 2020

The commercial Real Estate sector has made large strides in the past decade. Robust occupier interest, ascension of organized Real Estate developers and the emergence of institutional capital have accelerated this growth. The quarterly growth in office space take was up by 14% from Q2 2020 – Q3 2020, with increase in absorption of space from 6.9 million sq. ft to 7.9 million sq. ft. At an overarching level, the future of the workplace has been witnessing a lot of debate, most of which has been centered around how office space would be used and designed, what role would tech play, and what status would the workplace hold in terms of its physicality amid changing work patterns.
The post-Covid-19 new normal has been characterised by the evolution of work patterns, which has altered the way both occupiers and developers have operated so far. While concepts such as wellness, workplace strategies and agility have been around for some time, their enforcement is expected to strengthen and advance further in the coming years. In addition, as operations have commenced in a phased manner, companies could in the future prefer a more distributed workforce. Therefore, it would be reasonable to believe that the workplace would be less centralized and have more widely distributed teams that are appropriately linked through technology.

We are also witnessing a growing inclination towards a hybrid work model, wherein, a portion of the workforce would be able to work-from-anywhere (WFA) with the option to operate out of remote locations on certain day/s of the week. However, a majority of the firms would retain the traditional physical space model as they arrive at an optimum remote working / workforce intensity for themselves.

**Retail:** Quarterly growth was up by 79% from Q2 2020 – Q3 2020

The growth of the Indian retail sector has been marked by rapid evolution in consumer behavior and growing integration of online and offline retail formats over the past few years. Discussion around the transformation of the retail sector has intensified in recent years as the industry adopts new technologies and approaches to fulfill consumer demand. The pandemic has accelerated many of these trends, with e-retail progressing from being a regular habit for a minority of consumers to becoming a new norm of shopping behavior. The quarterly growth in retail space take was up by 79% from Q2 2020– Q3 2020.

Going forward, upmarket and niche grocery stores are likely to expand as Indians become more health-conscious and dine at home more frequently. Within F&B, fast-food players and coffee shops would continue to expand cautiously, with rationalized spaces and a robust home-delivery model. Touchless tech would also be a key trend as retailers increasingly digitize merchandising and transactions. The role of brick-and-mortar stores would evolve from just being a point of sale; they would be expected to also serve as platforms to engage consumers and amplify brands. This might require a thorough re-evaluation of the location, design and operation model of retail properties. Within retail stores, CBRE also foresees a change in space densities of fitting rooms, product testing zones, pick-up counters, and stockrooms. This changing nature of the retail store is likely to spur retailers to diversify their store formats and networks. CBRE expects to see a higher number of stores with unique features and product mix – all of which would continue to operate under a cohesive brand culture.

**Logistics:** Quarterly growth was up by 105% from Q2 2020 – Q3 2020

India’s Industrial & Logistics (I&L) RE sector has witnessed a transformation after 2017 in terms of the quality of assets, mode of operations and type of investments. Despite the pandemic affecting leasing activity, it has shown remarkable resilience. In 9M 2020, 3PL firms and e-commerce operators accounted for more than half of the leasing activity, followed by engineering and manufacturing firms. Hyperlocal delivery gained steam during the pandemic as e-commerce players began sourcing their deliveries from neighborhood stores to meet customer demand. The quarterly growth in warehousing space take was up by 105% from Q2 2020 – Q3 2020, with increase in absorption of space from 2.2 million sq. ft to 4.5 million sq. ft.

The coming year is likely to see a continuation of this trend as demographic groups that previously displayed resistance towards online shopping have displayed acceptance due to its recently realized convenience and health safety. As a result, maintaining higher stock levels is likely to become a norm which is expected to generate higher I&L demand from e-commerce players and in turn, 3PL firms. Another outcome of the pandemic on the Indian I&L sector has been the diversification of the supply chain, given the disruption caused by the pandemic in both supply and demand. As a result, occupiers are now adapting a modern, networked supply chain ecosystem that lays equal emphasis on resilience, near-shoring capability, sustainability, and agility, thereby ensuring timely and transparent data flow among stakeholders. This digitization is also moving towards warehousing facilities where, going forward, the use of AI, IoT and Big Data would result in the creation of smarter warehouses that would significantly improve supply chain efficiencies.

**Residential:** Housing sales in Q3 2020 increased by 86% on a quarterly basis

Green shoots of recovery have now been witnessed as housing sales in Q3 2020 increased by a strong 86% on a quarterly basis. The apartment units covered in top 7 cities was 12 thousand units in Q2 2020, however it grew to 22 thousand units in Q3 2020. This was largely due to strong policy support, low mortgage rates, reduction in stamp duty and property registration fee (in a few states), along with incentives and attractive payment schemes offered by the developer community. Last-mile funding mechanisms provided by the government for delayed housing projects have helped in boosting stakeholder sentiments. This has created an enabling environment which has strengthened the confidence levels of end-users and fence-sitters.

Going forward, we expect a gradual improvement in sales across all segments, although mid-income (Rs. 45 lakh to Rs. 1 crore) and budget (less than Rs. 45 lakh) categories are expected to be the key focus areas among homebuyers and to perform relatively better. The two segments together accounted for a share of more than 80% in overall housing sales in YTD 2020 and are expected to dominate residential sales going forward in 2021 as well. In addition, projects launched in locations with developed physical and social infrastructure are expected to see greater traction in the coming year.

Although the demand for ready-to-move-in projects is expected to be stronger, GST rate cuts for residential properties have bridged the taxation gap between an under-construction and completed project, thereby whetting the appetite for under-construction projects. We expect similar policy measures to continue to bolster housing demand. Heightened activity is expected in leading cities such as Bangalore, Hyderabad, Mumbai, Pune and in Delhi-NCR (select parts of Gurgaon and Noida).
Alternate Segments: Flexible Workspaces, Data Centers, Cold Storage Units

The year 2020 has witnessed an amplified interest in alternative asset classes such as flexible workspaces, data centers and cold storage units. We expect this interest to continue into 2021 as well. Flexible workspaces over the last few years have been gaining traction in India. The coming years are likely to witness occupiers adopting a service-oriented role, leading to the growth of space-as-a-service model. Providing customised end-user experience is also likely to gain more ground, which could give a fillip to managed workspace providers.

The rise in usage of smart devices, coupled with increasing amounts of data consumption, has led to a surge in data storage and processing requirements in India, which has further widened the role of DCs. We believe that occupier demand for data storage is likely to increase in the coming quarters, with the country’s DC capacity expected to cross 600 MW during 2020-21. Supply addition in the coming years is expected to be dominated by Mumbai, Chennai, Hyderabad and Delhi-NCR.

The demand for CS facilities is being further fueled by huge omni-channel distribution of Food & Grocery (F&G) across tier I and II cities. Currently, the overall cold storage (CS) capacity in India stands at about 37-39 million tons. CBRE expects the overall CS Real Estate stock to rise to 1,400 -1,500 million sq. ft. and the overall CS capacity is expected to reach 70 - 75 million tons by 2023.

Outlook

In these extraordinary times, RE stakeholders have an opportunity to structurally reimagine their strategies to ensure sustained recovery. Doing so would require shifting from traditional approaches and embracing new, transformational methods — which would be accelerated by widespread tech adoption, sustained policy impetus, and accelerated investor interest. We believe that with stakeholders becoming increasingly interconnected and interdependent, they would need to jointly develop their RE strategies going forward. In the long term, most businesses would have to relook at their space design from a technological and social distancing perspective to streamline sanitization methods being deployed currently. Another potential shift in long-term occupier strategy would include a stronger preference for buildings with wellness and sustainability features. Overall, we expect demand for Real Estate to remain robust and the sector to emerge resilient in the future.
Satish Magar, President, CREDAI National

The Real Estate sector in India has been facing headwinds from the past few years. The situation became tougher owing to the Covid-19 situation across the globe. Construction activities were brought to a sudden halt in the first quarter (Apr – Jun) due to the lockdown and the uncertainty over jobs and livelihoods robbed the market of its potential buyer-base - leading to near zero demand. Post lockdown sales trajectory gives some hope but is yet to touch pre-Covid levels in most cities across the country.

The Government has announced relief measures to aid businesses through these challenging times - be it the loan moratorium, lowering of repo rate resulting in lower interest rates for home loans, approval of projects of Rs. 12,079 crores under SWAMHI fund, and so on. The one-time loan recast has kept almost 95% of the developers out of its ambit due to Standard Account criteria while ECLGS Scheme and increase of safe harbor limit from 10% to 20% in the circle rate and selling price are welcome steps. There are indicators that point towards recovery in the sector, at a less than desired pace. However, the steps announced by the GOI and RBI mitigate the Covid-19 impact to a certain extent and do not address the prolonged problems of the realty sector, which has been ailing due to the challenges created by an array of factors over the past few years. The Government approach to the issues faced by the RE sector needs to be balanced both on demand and supply fronts.

Chintan Sheth, Director, Ashwin Sheth Group

2020 has been a roller coaster ride for the Real Estate industry. The lockdown adversely impacted the sector, resulting in stoppage of construction work and less disposable income with potential buyers due to layoffs and salary cuts. However, we all powered through this pandemic and witnessed a silver lining with a resumption in construction activity. And the extension in project completion deadlines, reduction in stamp duty and timing of the festive season encouraged the RE sector needs to be balanced both on demand and supply fronts.

Ashish Sarin, CEO, AlphaCorp

The Real Estate sector has witnessed a revival in sales and demand, which are expected to grow in 2021. The pandemic has led to reverse migration to Tier-II cities so demand for homes in these regions is expected to see a positive fillip in the coming year as these cities offer low-cost and relatively larger unit areas, besides lower cost of living, tranquility, and clean air. The ultimate change, however, can only be brought about by consolidated efforts of the industry players, and the trend has already begun.

Amarjit Bakshi, Chairman & Managing Director, Central Park

We are entering 2021 with high hopes. Housing sales saw a sharp recovery in the second and third quarter in all top cities compared to the preceding quarter. With this, it is further expected that the sector will exhibit healthy growth in the future. The pandemic has played a part in shaping sentiments, tastes, and preferences. There is an emerging trend of settling into townships due to the availability of a plethora of amenities available within the vicinity. Integrated urban areas with spaces that are multi-purpose for use will gain more momentum. There will continue to be increased focus on sanitization, hygiene, cleanliness and wellness in apartments and on creating work-from-home office spaces.

Kaushal Agarwal, Chairman, The Guardians Real Estate Advisory

While it was being extensively predicted, immediately after the announcement of the nationwide lockdown, that this year for the Indian Real Estate sector will be the year of its greatest fall, the outcome was quite the opposite, with the month of November 2020 recording the highest number of residential registrations in almost a decade. The two most crucial reasons for such an unprecedented recovery was the RBI’s decision to drastically reduce the repo rates that prompted the banks to reduce their lending rates for homebuyers; the second was the decision of various state governments to temporarily reduce stamp duty charges. The reduction of borrowing cost and transaction cost had the highest impact on developments that were ready-to-move-in, as such homes anyways do not attract GST and the reduction in stamp duty charges ensured negligible tax cost for homebuyers.

Going forward, we believe that post April 2021 there will be a period of slowdown, after this phase of panic buying until March 2021. We recommend the stamp duty charges be restricted to 3% for another 12 months post the date defined by the state government of Maharashtra. We would also urge states across the country to consider reducing stamp duty charges temporarily to make buying property lucrative. On the other hand, we sense the government at the centre is wanting to bring lending rates closer to levels at which the west lends and it is this that the Modi-led government believes will be the next leg of growth. We would also like the government to announce the 10% deviation in circle rates for all categories of homes and not restrict it to just homes up to Rs.2 crores as this will help further reduce the unsold inventory levels in the luxury home segment. We expect the GDP growth to turn positive in Q4 this financial year.
Karan Kumar, CMO, DLF Ltd

We have started to witness a considerable revival in the consumer sentiments in the past quarter. The current pandemic has made people realise the importance of owning and living in their own homes and want to upgrade to greener, more luxurious, and well protected homes. Condominium demand is expected to be healthy in most of the metro cities. There will be a shift in demand for not just larger homes, but homes that offer a bouquet of lifestyle offerings. Also, with home-loan rates being at an all-time low, we expect the demand and inquiries to continue in the next financial year. India, being a major investment destination for global corporations, will see a rise in investment, and the realty sector would have the opportunity to reap the benefits - both in commercial and residential developments. We see a number of NRIs either moving back to India or looking at investment options here. This will boost the demand for homes starting from mid-segment housing to luxury and super luxury homes.

Pankaj Bansal, Director, M3M

Bolstered by the revival of economic activity and government initiatives, the Real Estate sector witnessed a turnaround in the festive season. We foresee this momentum to sustain in 2021 due to anticipated economic stability and the revival in customer sentiment. We also expect that 2021 will see consolidation of the industry in favour of organized developers, leveraging of technology to enhance customer experiences, and customer-centricity as the key objective of developers. In the commercial segment, the high-street concept has gained momentum as compared to malls and this will continue in the coming year. The residential segment is already on the path to recovery owing to the pent-up demand and the need to invest in well planned, spacious homes amidst extended work from home. The mid-segment in the range of 85 lakhs to 1.5 crores will witness the highest demand in the residential segment. We recorded sales worth Rs.2500 crores from Apr-Nov 2020 and expect to close this year with a 10% increase in revenue in 2020.

Infrastructure

Kshitish Nadgauda, Senior VP & MD - Asia, Louis Berger

As far as infrastructure development is concerned, the status quo was largely maintained with most of the ongoing projects continuing to be executed across all sectors, albeit at a slower progress rate on account of the nationwide lockdown. New projects were either stalled or experienced a longer tender and award cycle. It is worth noting that the economy had slowed down even before the pandemic which necessitated diversion of critical resources towards containment of the same. Funds had to be diverted to social and health-related causes. The economy started to show signs of a modest recovery in September, with new infrastructure projects beginning to come online towards the end of the year.

In 2021, with the country now largely open for business, barring some restrictions on international flights, the government must give the economy a solid boost with a generous stimulus package for large infrastructure projects. The government needs to boost infrastructure spending across all sectors, but with a focus on de-densification of urban settlements through low-cost housing programs and through the establishment of greenfield development nodes with state-of-the-art infrastructure away from existing urban centers. Such development nodes would need employment-generating investments. The Government must therefore reassess the policy framework towards attracting more FDI across diverse sectors. Healthcare infrastructure must also be given a boost so that any reoccurrence of a pandemic in the future could be better handled, and without crippling the economy.

Vinayak K Deshpande, Managing Director, Tata Projects

Driven by the pandemic and resulting lockdown, we migrated to new digital tools and processes both on and off ground to improve efficiency. We embraced remote working methods and learned to operate with minimal overhead expenses. These measures helped us to enhance our performance amidst crisis; in fact, we built a greenfield hospital comprising 550 beds in a short period of three months.

Infrastructure projects have long gestation periods ranging from three to six years, therefore, short-term disruptions did not have a major impact on the overall industry during 2020. If India has to attain the government’s goal of becoming a $5-trillion GDP by 2024 – then we have to look beyond challenges of 2020 and grasp opportunities in 2021. As most infrastructure projects are government funded and the nation needs good quality infrastructure to keep accelerating India’s progress – the forthcoming year and mid to long-term scenario looks promising.

In the year ahead there will be increased deployment of machines at project sites for timely completion, and enhanced adoption of technology. We have used drones for undertaking stringing operations at our power transmission projects which led to reduction of time and costs while lowering the need for manual intervention. We have started using digital technologies such as 3D & 4D Building Information Modelling (BIM) across many of our projects. Such technology adoptions are expected to increase across the industry in 2021.
From affordable homes to neighbourhood convenience stores, from owning a house to living in gated communities, and to emerging segments like warehousing and logistics, a spate of new trends are gaining traction which will mark the year 2021, observes Vinod Behl.

Affordable Homes
The residential real estate that was already facing a slowdown, got a crippling blow with the pandemic in 2020. With job losses and salary cuts, the spotlight increasingly turned on affordable and mid-segment homes. Affordability of homes calculated on the rate of home loan repayment to income is expected to go up in 2021, which in turn will push demand for affordable homes. According to industry statistics, the affordability of homes will improve by 50% in FY 2021 against the affordability seen in FY 2012.

Historically, low interest rates have been a major driver of affordable homes. The year 2020 saw home loan rates dropping to sub 7% and with substantial interest subsidy of up to ₹2.67 lakh under Pradhan Mantri Awas Yojana (PMAY), affordable housing got a big boost. According to International Property Consultancies (IPCs), majority of the homes sold in 2020 were in the affordable housing category. Even 70% of the new home launches happened in the affordable segment. With banking and financial experts predicting the low interest rate regime to continue in 2021 and credit linked subsidy scheme under PMAY likely to be extended beyond March 2021, affordable housing will be the flavour of the season in 2021. The government’s major policy initiative in terms of Special Window for Affordable & Mid-Income Housing (SWAMIH) Fund to aid housing projects stuck for lack of last mile funding, will give a big boost to affordable housing, as the disbursement under this fund gains traction in 2021.

Neighbourhood Shopping Centres
Shopping malls which remained shut for months, saw abysmally low footfalls after they reopened. It is the neighbourhood shopping centres, particularly convenience stores within group housing complexes and townships, which turned saviours. Residents have been preferring to shop within the safe and secure environs of their gated complexes. This retail trend will gain further momentum in 2021 as people continue to be safety conscious.

Taking note of this trend, real estate developers have been making provisions for dedicated retail hubs in their residential projects. These convenience shopping complexes provide a complete shopping experience with premium to daily need brands, besides F&B outlets, ATMs/banks, and entertainment outlets. With power and water back-up, these modern retail complexes, designed for operational efficiency, hold promise for investors also. Considering the growing demand for these neighbourhood convenience shopping complexes, the Haryana government has amended its Affordable Housing Policy to double the commercial space for retail within their group housing. These retail hubs will show greater promise for developers, home buyers, and investors in the new year.

Preference for Buying over Renting
In the aftermath of the pandemic, accommodation seekers, especially millennials, will be preferring to own a home rather than renting it, simply because of the health safety and security reasons.
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In fact, a large number of homeowners were reluctant to give their homes on rent for the very same reason. According to the India Real Estate Survey by real estate consultancy NoBroker.Com, in Delhi-NCR, about 73% of the existing tenants (of which 58% are millennials) are looking to buy a home in 2021.

Emerging Segments of Commercial Realty

The office realty, which showed good growth in 2019, was badly hit by the pandemic. According to Savills India Report, office absorption across India’s six major cities declined to 27.4 msf in 2020, registering a drop of 51%. However, office realty displayed strong resilience and could well be on a strong growth path in 2021 - and achieve pre-Covid levels. This is due to the economy picking up pace and commercial segments like warehousing, logistics and data continuing to witness strong leasing transactions. The Transport and Logistics segment increased its share from 1% to 3% in 2020. As per a Knight Frank India report, about 3.5 msf of warehousing stock was added in tier 1 cities in Q3 of CY’20, registering a growth of 68% compared to the previous quarter. Around 3.8 msf of space was absorbed – registering an increase of 93% over the previous quarter. Disruption in supply chain across industries is proving to be a boon for warehousing. Logistics players are also set to benefit from higher freight volumes. There will be an upside in logistics stocks as valuations are attractive. In view of this, foreign PE funds will be increasingly betting on warehousing and logistics.

Data Centres also continue to be a major driver of office realty. According to Colliers India, the share of data centres in the India Real Estate PE Investments was as high as 46% in August 2020. Data centres occupy 7.5 msf space in the top 8 cities. Another 10 msf new space will be added by these centres over the next 2-3 years. In view of the good growth prospects, big developers like Adani and Hiranandani have lined up ₹10,000 crore of investment in data centres in Uttar Pradesh. The introduction of 5G will further push demand and with the government preparing to give infrastructure status to data centres in its draft policy, this segment of real estate will get a big boost, in turn pushing demand for office realty.

Safe Living in Housing Societies

According to a survey, more than three-fourth of home seekers are preferring society living over independent villas and standalone homes/builder floors, due to increasing concerns about their health and safety. They are opting for flats, villas, and floors in gated complexes, as group housing societies provide community living with health and wellness amenities like a gym, meditation centre, jogging tracks, and common facilities like a club house, shopping centre, maintenance, and home services like plumbing, carpentry, electricity, sewage, garbage disposal etc. Visitors are screened at the entry gate of the housing complex, and entrance lobbies in the residential towers have health screening facilities too. The security, rent and maintenance payment and the neighbourhood retail apps enhance the liveability quotient of a group housing society.

The writer is Editor, PropTOQ Real Estate Magazine.

Portable Multipurpose Reusable Living Units (PMRLU) for Onsite Workers

Mumbai-based Habitat n Skins is offering modular and factory assembled housing units for site workers and captive staff at construction sites. The PMRLU is the ideal solution for project developers / contractors looking for housing for their workers. It will also save them time and space, which, if not well planned and managed at the congested jobsites, can lead to delays. Being lightweight, they are easy to transport, quick to assemble and dismantle, and can be easily shifted from site to site without having to make a fresh investment.

The PMRLU is designed by re-using shipping containers, and fitting them with a door, windows, exhaust, insulation, flooring, lights and electrical power points, bunk beds, a toilet cum bath area, and a small pantry. Measuring 20 feet, each unit can house 4 workers.

A unit takes about 15 days to be ready in the factory. Once it is 90% ready, it can be shipped to the construction site and assembled with utility connections within a day or two. Habitat n Skins is offering single as well as multiple units, which can be stacked one above the other, thus saving space at sites. The units are reusable and can be modified for purposes such as isolation during a pandemic.
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General V. K. Singh (Retd.),
Minister of State for Road Transport and Highways, Government of India, New Delhi

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**The Maharashtra Police Housing Project**

B.E. Billimoria is building the project the Smart Way using Precast Concrete Technology and Machines from Elematic, and precast construction services of principal contractor IQB.

**Moving to precast concrete technology**

The move to precast technology has been made following the growing demand for high-quality affordable housing. "With the rapid economic growth and unprecedented pace of urbanization, there is a staggering demand for affordable housing in India. The government has already set an ambitious project to build 20 million affordable houses and 98 smart cities by 2022. Precast concrete building technology will be the key enabler for such projects, as it will ensure faster completion of projects and also bring down the overall cost of construction," says Kapadia.

He elaborates: "The traditional construction methods used in India require a lot of laborers for extended periods of time, which results in high costs, long duration of construction, and quality variance due to human interventions. Precast concrete as a building method allows for more control over the entire project. As we increase the size of the projects and as we go towards megaprojects, the workforce required becomes highly variable. To avoid such a situation, and to have complete control over quality, cost, and timelines, we decided to go for precast construction."

Listing the benefits, he says, "Quality is the biggest benefit because the slabs, beams, columns, and walls are produced with precision in a controlled environment. Speed of construction is another factor, because your financial loss or gain depends on how soon or late you complete the project."

**Collaborating with a world-class partner**

While looking for a suitable long-term precast machine supplier for its precast project in Pune - a mass affordable housing for the Maharashtra police - Elematic caught Billimoria’s attention. “After evaluating a lot of companies, we zeroed in on Elematic given its strong presence in India. We felt confident about the performance..."
of its machines and assured by the company’s after-sales service and support,” says Kapadia.

Billimoria’s 2-acre precast factory located within a 116-acre site in Pune includes a production unit for making slabs, walls and staircases, and a storage yard. It has a capacity to build about 1.5 million square feet of construction area in a year. Informs Kapadia, “There are three slab beds of 120 m length and we mainly make load bearing walls. We have battery molds and mechanical tilting tables, and molds for staircase walls. The shuttle supplies the concrete bed, and it can also go to the battery molds. The logistics has been worked out by Elematic and our engineers, and the whole set up works well. Elematic also helped in setting up the cranes to take the finished products from the factory to the storage yard. There were a few hiccups, no doubt, but overall, Elematic and Billimoria have done a great job in getting the finished products on site and delivering as per the requirement.”

As per the service agreement, Elematic’s team has been present on the job site to provide support for any issues on the quality of the products or the performance of its machines. For instance, when the thickness of the wall elements needed to be changed from 170 mm to 160 mm, Elematic’s experts swiftly rose to the occasion by helping in refabricating the elements and ensuring that the production continued without causing any delay. “I think that the slab quality, which we are getting right now is beautiful and definitely gives us more confidence in precast,” affirms Kapadia.

No quality compromised in the Maharashtra Police housing project

The Maharashtra Police housing project for retired policemen covers 180 acres of land. Billimoria has started to build about 40 acres for 5200 apartments, all of which must be completed within four years. All the buildings are ground + 14 stories and will be built using precast technology. “The building design is simple with a few variations. We are very proud of the project as it is for the Maharashtra Police. We aim to give them affordable prices with the good quality that they deserve - having served the state for so long.”

**Project Facts**

**Project:** Maharashtra Police Mega City  
**Location:** Pune  
**Contractor:** BE Billimoria & Company  
**Precast Contractor:** Ingenious Quality Buildings (IQB)

**Other Details**
- 4.5m sq.ft.  
- G+14 buildings, 60 towers  
- 1RK, 1BHK, 2BHK, 3BHK, 3.5/4.5 BHK Apartments  
- **Structural system:**
  - Load bearing wall frame for gravity and lateral load resistance for wind and earthquake forces. System includes load bearing walls and prestressed solid slabs. Structural walls at the perimeter also act as facade for the buildings; the facades will be painted
  - Slab span around 6 meters designed for superimposed dead load for floor finish and internal partition walls, amounting to uniform loading of 3 kN/m², and live load of 2 kN/m²
  - Prestressed solid slab is used for providing flexibility in the architectural layout, speed of construction, and reduction of steel consumption
- **Precast elements used:**
  - Load bearing walls
  - Solid prestressed slab
  - Staircase

All the buildings are designed for 50 years as per the design requirement for RCC structures under the IS codes. The life of precast products can easily be assumed to be more than 50 years as their production is done in a controlled environment, resulting in good quality.

Check out the project via the link: [http://mpmcpune.com/index.html](http://mpmcpune.com/index.html)
Elematic deliverables

- Equipment:
  - Mechanical tilting tables
  - Three 120-meter slab beds with a slipformer
  - Battery molds (original and cold shutter)

- Services:
  - Complete project design and engineering
  - Plant installation
  - Production and installation supervision
  - Annual maintenance agreement

Elematic Oyj is a world-leading manufacturer of precast concrete plants, production lines and related machinery. During its 60 years of operation, the company has supplied precast concrete production technology to over 100 countries and to every continent. It has subsidiaries and sales offices in the USA, Germany, China, Russia, India, Hong Kong and the UAE, and agents in over 20 countries. It has its headquarters in Akaa, Finland, and production units in Finland and India.

Elematic provided all the structural design to the Maharashtra project. The precast products used include load-bearing walls, solid prestressed slabs, and staircases.

End-to-end precast service provider

The Maharashtra police housing project is about 5 million sq.ft of residential development, comprising of about 60 towers and 5248 homes in all. It is being built using Elematic’s precast equipment and methodology. Says Sandeep Bedi, Managing Director, IQB Private Limited, the principal contractor for B.E. Billimoria. “I think precast is the smartest way to build buildings in India as 90% of the building can be made in a controlled factory environment, free of weather or labour dependency."

As an end-to-end precast construction service provider, IQB (Ingenious Quality Buildings), specializes in PMC, planning, production, logistics and installation, and has a highly experienced team of over 100 precast professionals.

Direct savings due to fast construction

The onsite precast plant minimized crane requirement at the housing project, with only four tower cranes - each handling three buildings at a time. “The ingenious part is that we are using one tower crane on three different buildings, all of which are at different points in the lifecycle. If we are installing walls in one building, another is at the stage for steels or needs structural topping, while in the third building, we are in the process of laying the screed,” explains Bedi.

“Speed of construction is key to cost saving. The interest rates for real estate projects in many developing countries are very high at 18 to 20% annually. So, if I can reduce the construction cycle by six months, it would lead to a direct saving of almost 10%,” says Bedi.

Not just an equipment vendor

“The journey so far has been extremely interesting with a lot of learning. Elematic brings a wealth of knowledge and global experience. It also has a lot of information on the potential of precast as an industry in India. The company has handheld us to beat every challenge, be it in production, installation, or even manpower training. Our partnership with Elematic has helped us create a very high-quality product, which will eventually help us make a home which will be cherished by the families for a long time,” he concludes.

The Potential for Precast in India

Technavio, a global technology research and advisory firm, has released a report claiming that the global prefabricated construction market is expected to grow at a CAGR of 6-7% until 2020. In India, the uptake of modular technologies continues to remain slow; prefabricated buildings comprise only 1% of the country’s $100 billion Real Estate Market.

“With demand increasing every year, a lot more people are willing to take a chance on precast. As more and more people become aware of the benefits of precast concrete technology, it will gain traction. The government is also trying to push projects using precast solutions. So, I’m very positive about precast in India,” says Kapadia.
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CASE India has positioned itself as a formidable solutions provider in the Indian construction equipment market with its wide range of compactors, skid steer loaders, motor graders, dozers, backhoe loaders and other heavy line of machines. “And now, with the introduction of our first Made-in-India crawler excavator, we have become a full-line construction equipment player in India. The CX220C is designed to tackle the most grueling challenges in the toughest terrains of India, and we are confident that it will enhance the company’s competitiveness in the crawler excavator segment as well,” avers Raunak Varma, Country Manager, CNH Industrial India.

“Our manufacturing plant in Pithampur (Madhya Pradesh), is a shining example of our Make in India philosophy. In fact, we plan to make it a manufacturing hub for other world markets as well,” says Varma. “The CX220C Crawler Excavator, for instance, has its welding joints made for long-lasting strength, and our ultra-modern paint shop has given it a superior finish using new-gen, eco-friendly technologies. It has been customized to meet our region’s specific requirements and comes with CASE’s promise of efficient performance for application in stone quarrying, road construction, and even general construction and irrigation.” He informs that the indigenously manufactured CX220C will also be introduced across Asian and African markets.

“CX220C is a testimony of our innovation, advanced technology, and most importantly, it has been designed and constructed based on customer feedback,” adds Sandeep Mathur, Brand Leader, CASE India. “When we were developing this product, we talked to customers regarding their requirements, and as per their feedback, the machine has been engineered to give high productivity with reliable performance, besides fuel efficiency, and it has a robust structure for working in tough conditions.”

“In India’s CE industry, the crawler excavator market is the largest in terms of value and the second largest in terms of volume. More than 60% is comprised of the 20-ton class. The CX220C, however, is a premium product in the 22-ton electronic engine segment,” informs Varma. “When we showcased it for the first time at Excon..."
2019, it generated a lot of interest. In fact, we tested no less than 10 prototypes of this machine across various applications such as gravel loading, blue metal quarry, riverbed excavation, marble mining, granite mining etc. These machines have clocked over 16,000 hours of work in the field without any problem. The design and engineering of CX220C is an outcome of the feedback gleaned from the performance of these 10 machines.”

Prior to the market launch, CASE India conducted roadshows across the country to offer customers a first-hand experience of the excavator’s superior quality, high precision, and advanced features. The company is also offering a rental service for customers who want to try the machine for a short period of time before buying it.

“The secret of developing a good excavator is balancing - speed, power and force. With the technical support from Sumitomo of Japan, we were able to have a very efficient hydraulic system that can move the CX220C at a high speed and smoothly without bouncing such that the operator is able to maximize productivity,” adds Varma.

Mathur informs that CASE India has a network of 75 dealers and over 200 touch points. A centrally located warehouse stocks spare parts for quick delivery to any part of the country. “Because of our strong back-end support, our customers have to face minimal downtime of their machines and are thus able to increase their productivity. For the 22-ton excavator segment, we are providing a two-year warranty, besides which, we have customizable, extended warranty offers, spares and service packages, including filters, maintenance parts and oils. We have a dedicated sales force and service engineers in key markets for the crawler excavator; this ensures complete attention to the customers' queries, timely onsite support, and speedy resolution of any issues. What’s more, CASE India offers buyers a comprehensive machine and service package funding through its financial arm - CNH Capital - with low interest rates and flexible payment plans.”

CASE India’s manufacturing facility, which is certified by WCM (world-class manufacturing program), carries forward the 175-year legacy and technological know-how of CASE Construction Global. In line with globally set quality standards, the plant produces machines using world-class technology and has highly skilled technicians. The machines manufactured here are exported to more than 30 countries. Says Varma, “As one of the biggest construction equipment markets and one of the fastest growing economies in the world, India is a key part of our growth strategy. In fact, CNH Industrial India and CASE have a 30-year-old association with the Indian market. We are continuously growing our product portfolio, manufacturing capabilities, and customer touchpoints, and are confident that the CX220C Excavator will prove to be a game changer for India.”

Features of CX220C

- Built specifically for Indian terrains, it has an operating weight of 22 tons, and delivers maximum productivity with lower fuel costs and faster cycle times.

- It is equipped with a new 6-cylinder fuel-efficient electronically controlled engine, developed by sister brand FPT Industrial. It delivers gross power of 117 KW (157 hp) and peak torque of 622 Nm at 1800rpm. It has five energy saving controls and ECO gauge function for continuous fuel consumption monitoring to help reduce fuel costs.

- 33% stronger heavy-duty arm, boom and undercarriage improve its durability. This, together with longer service intervals, lead to lower Total Cost of Ownership. Its design facilitates easy maintenance from ground level.

- The proven CASE Intelligent Hydraulic System (CIHS) provides outstanding control with unmatched power and fuel savings across all cycle phases. Two variable displacement axial piston pumps with a regulating system are combined with the CASE main valve, designed in Japan for precise and efficient operations. The hydraulic system is governed by a Machine Control Unit which uses input from pressure sensors located on the pumps, main valve, and pilot lines, and it is in constant dialogue with the Engine Control Unit to optimize machine output at all times and in all conditions.

- It has three power modes: Auto, Heavy and Super. Operators can also store up to 10 auxiliary hydraulic flow and pressure settings to switch between different attachments without any mechanical adjustment. This customized operation renders the machine highly versatile while maintaining power output.

- It is equipped with CASE India’s renowned Telematics system for real time updates.

- The HVAC cabin has ample legroom for a comfortable working environment. An ergonomically designed mechanical seat has eight separate adjustments to enhance operator comfort and productivity. A new vibration dampening system protects against fatigue. There is 25% more airflow due to an Auto Climate Control while eight vents give more cooling efficiency during summers. An openable roof panel enables better visibility, while an integrated 7-inch LCD Color Monitor has been set up for real time parameter monitoring.
The Wirtgen Group: New Generation of Material Feeders from VÖGELE

The MT 3000-3i Standard and MT 3000-3i Offset Power Feeders from VÖGELE guarantee constant, smooth transfer of material, and now give paving teams numerous practical new features. They are integrated with the latest Dash-3 machine concept and an optimized material handling and maintenance system.

Material feeders form a hub in the transfer of material from trucks to pavers, thus guaranteeing a constant and efficient paving process and high paving quality on large job sites. To increase the user-friendly nature and efficiency of the machines, JOSEPH VÖGELE AG has now comprehensively overhauled its former Dash-2 generation: the new MT 3000-3i Standard PowerFeeder and the MT 3000-3i Offset Power-Feeder with pivoting conveyor are now equipped with the efficient and ergonomic Dash-3 machine concept. This includes, among other things, the ErgoPlus 3 intuitive operating concept, AutoSet Plus automatic functions and the PaveDock Assistant truck communication system.

VÖGELE has also optimized the material handling concept: the new design of receiving hopper, the improved conveyor belt control, and the effective belt heating system allow material to be unloaded and conveyed rapidly without loss – whilst simultaneously reducing wear. Maintenance and transport have likewise been simplified: users can now reach setting and cleaning points even more conveniently. The angle of inclination and the receiving hopper have been optimized for transport on a low-loader.

“We have developed the new generation of PowerFeeders in close collaboration with our customers,” says Bastian Fleischer, product manager at JOSEPH VÖGELE AG. “All the functions are aimed at making job site processes even more efficient, economical and convenient – whilst delivering the same high performance.”

Both versions of the material feeder achieve a conveying capacity of up to 1,200 t/h and can accommodate a full truckload of mix within 60 seconds. The MT 3000-3i Offset is also equipped with a conveyor belt which can be pivoted 55°. This provides contractors with a wide variety of potential applications, from parallel feeding two pavers to the so-called InLine Pave method, in which the material feeder, the paver for the binder course, and the paver for the surface course work one after the other.

The latest operating technology plus practical convenience functions

Both the MT 3000-3i Standard and the MT 3000-3i Offset integrate the ErgoPlus 3 operating concept to increase efficiency on the job site. In the process, VÖGELE designed the operator’s console specifically to suit the requirements of material feeder operators, making it as intuitive and convenient as possible: all the functions are arranged in logical groups, and clear function and status indicators, a high-contrast display and glare-free backlighting also facilitate operation for users. The pivoting seat console, for example, also facilitates ergonomic working with perfect
Comprehensible, clear and ergonomic: VÖGELE has transferred the tried and tested ErgoPlus 3 operating concept to the new MT 3000-3i Standard and Offset material feeders.

Optimized material handling concept: the new design of receiving hopper, for example, guarantees extremely fast material transfer and loss-free conveying.

Quicker maintenance: VÖGELE has reduced the number of setting points, colour-coded them and improved accessibility.

Practical transport: a large angle of inclination and a receiving hopper which can be raised 25cm higher makes it easier to transport the feeder on a low-loader.

"Another important new feature is the optimized belt heating," says Fleischer. "The new control system provides optimum temperature management and is even more economical than before. The system can handle even critical materials, such as low-temperature asphalt, without loss of temperature."

Simple to maintain, simple to transport

The MT 3000-3i Standard and Offset material feeders, weighing some 20 and 24 tons, respectively, are real power packs - yet users can now inspect, maintain, and clean these new machines much more easily: VÖGELE has significantly improved access to the maintenance and setting points, as well as to the cleaning zones. For example, the transfer hopper of the MT 3000-3i Offset is hinged, and its larger step makes it easy to clean. The setting points have also been reduced in number and colour-coded to make them more easily identifiable. Contractors can also transport the new material feeders comparatively quickly and easily: on the one hand, the large angle of inclination of 15° makes it easier to load feeders onto commercial low-loaders, whilst on the other, the receiving hopper of the new models can be raised 25 cm higher than before. This now allows users to deposit material feeders on the so-called goose neck of the low-loader without any issues, significantly reducing transport length.

"Material feeders are now being used more and more. From a paved asphalt surface area of 6,000 m², they are compulsory in specifications, which was why we gave particularly high priority to rapid readiness for operation and simple handling when developing the new models," informs Fleischer. "With the new Dash-3 generation, we have once again significantly increased the practicality of the product."

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Liebherr unveils three new Machines and one new Design

Innovations have been the driving force at Liebherr-Werk Nenzing Gmbh from the very beginning. The year 2020 is no exception. Three new machines from the fields deep foundation, material handling and lifting have been recently unveiled during an online presentation. What was striking about them: all the models gleam in a new design.

Design
All colour compositions in the latest generation combine the classic Liebherr yellow with new black, grey and white accents. The design reflects how long-standing tradition and company values unite with advanced technologies. The elegant colour scheme prevails through all product groups and lends the machines a distinctive look and immediate recognition.

The new design focuses on an even higher level of safety which is emphasised, above all, by improved platforms and railings on the uppercarriage. With the additional add-on wing for mounting lights or cameras, the design is more flexible on the whole.

Inside the new cabin the operator experiences immediately how the overall concept fits harmoniously together: reduced noise, panoramic view and comfort. This is achieved through a modern air-conditioning system with improved airflow, an optimised field of vision and an orthopaedic operator’s seat with integrated heating and cooling. Additional safety is provided by the stone protection, even in the toughest of applications.

Deep Foundation– LRB 23: Continuation of a Success Story
The compact piling and drilling rig type LRB 23 closes the gap between the LRB 16 and the long-proven LRB 355. The new all-rounder for deep foundation work offers an impressive engine output of 600 kW and so delivers the necessary capacity for all common deep foundation work, such as drilling with a Kelly drill, double rotary drill, full displacement equipment and continuous flight auger, as well as soil mixing and applications with a vibrator or hydraulic hammer.

The compact design of LRB 23 allows for its transportation in one piece, thus simplifying mobilisation between jobsites. The remote control simplifies the loading process for transportation as well as the assembly of the machine.

The advantages of the rigid leader are proven in operation. As it can withstand high torques, even Kelly drilling is possible, which is unique for a machine of this size. The rotary drive BAT 300 delivers a maximum torque of 300 kNm.

Locking of the Kelly bar’s telescopic sections is made significantly easier with the aid of the Kelly visualization system in the LRB 23. Thanks to the real time display of the Kelly bar’s locking recesses on the cabin monitor, the operator is permanently informed about the actual distance to the next locking recess. Colour indications inform when the bar can be locked. Furthermore, false positioning of the Kelly bar during the shake-off process is indicated through a warning signal.

During continuous flight auger drilling, the concreting process is automated thanks to the drilling assistant. All assistance systems contribute to time savings, higher availability of the machine and a significant increase in safety during operation. The newly designed piling and drilling rig convinces through precision, high performance and a long service life.

Material Handling – HS 8070.1: The All-Rounder: Versatile and Flexible
With the brand new HS 8070.1, Liebherr unveils the newest generation of duty cycle crawler cranes. The machine has a lifting capacity of 70 tonnes and is the first choice for a multitude of applications: material handling, deep foundation work or lifting work.

Using the new self-loading system (Jack-Up System) the crawlers can be easily disassembled for transportation, thus reducing the transport weight to less than 35 t. The platforms and railings must no longer be removed before transporting.

Instead of a single counterweight, the machine now has a modular system. The duty cycle crawler crane can be individually equipped depending on the application. Further, the boom of the HS 8070.1 is compatible with the HS 8100.1. Therefore, customers can use attachments such as the slurry wall grab HSG 5-18 on both machines and install thicker slurry walls with a more compact machine.

As opposed to the fixed system, the new floating A-frame system ensures higher performance in dynamic applications. It also simplifies and speeds up the assembly and transportation of the machine. The user-friendly design extends to the tank neck, which is easily accessible via a platform on the uppercarriage – a perfect example of the modern design strategy.
Lifting – LR 1200.1 unplugged and LR 1250.1 unplugged: The World’s First Battery-Powered Crawler Crane

The LR 1200.1 unplugged and the LR 1250.1 unplugged are the world’s first battery-powered crawler cranes. Both are driven by electric engines with a system performance of 255 kW.

There are no compromises regarding performance or availability when compared with the conventional versions. The LR 1200.1 unplugged has a maximum lifting capacity of 200 tonnes and the LR 1250.1 lifts 250 tonnes.

The blue accent in the colour composition, which lends the distinctive look to the unplugged series, symbolises the electric solution representing an advanced technology. The unplugged cranes achieve the best possible combination of operator benefit, efficiency and environmental sustainability.

The new machines are emission free and have a very low noise level, which is a huge advantage in areas sensitive to noise and also for the people working on the jobsite.

The cranes can be recharged on a conventional jobsite electric supply (32 A, 63 A) in 4.5 hours and optionally with 125 A in 2.25 hours. The capacity of the battery is designed for 4 hours lifting operation. In accordance with their name, the cranes can be operated without a cable, thus “unplugged” thanks to the battery-electric drive design.

“Especially the year 2020 has shown that one must be open-minded and bold to break new ground. With our unplugged cranes we offer our customers an alternative drive design. As we have already seen with the LB 16 unplugged, the first battery-powered drilling rig, the strategy is a complete success. Strict requirements regarding environmental sustainability in tenders for construction projects increase the demand for advanced technologies. For us, it was clear that we extend and successfully establish the design in further product groups,” says Gerhard Frainer, Managing Director for Sales at Liebherr-Werk Nenzing GmbH.

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Customer Engagement

It's time to change the thought process of service providers, says Bhaskarudu Peddakotla, Consultant, Mining & Construction Machines.

We are now in the ‘Age of Customers’ where the buyers are empowered and are demanding a high level of commitment from suppliers. Simultaneously, technology is advancing rapidly in the manufacturing of machines, making equipment manufacturers competitive in incorporating the advanced features in their products, ahead of the others. Also, globalization has enabled consumers to get more options while choosing their products. Words like brand value or brand image are fading out as customers are now making their purchase decisions based on their experience of the product, and not on any perceived brand value.

Customers too have to compete to get their business going and to have their growth plans executed profitably. Asset utilization to the extent of 85% (20 hours a day working) has become a common phenomenon with a majority of the customers in order to realize their capital expenditure in the shortest possible time. So, asset reliability with consistent availability has become critical to the profitability of a business.

Customers are seeking products that perform consistently as per their expectation. They also prefer doing business with companies that offer continuous support and guidance. They will appreciate a service provider who will identify gaps in the operation and maintenance practices and advise corrective actions from time to time, rather than simply finding faults after the breakdown of a machine. A debate following a breakdown leads to conflict between the service provider and the customer as both try to defend their line of argument.

Sometimes, the service provider may win but it is at the cost of widening the gap between the customer and the service provider, and the customer may begin to consider alternative options for his new requirements. So, the major differentiator for sustaining businesses today is the quality of the aftermarket service and not just the quality of the product.

The time has come for equipment manufacturers to review their channel partners (dealers) afresh and assess their customer engagement capability. Areas where service providers need to focus:

**Site conditions:** It is essential for a service provider to study the site operation and maintenance conditions and guide the customer to bridge any gaps. Site conditions include haul roads, gradients, dust suppression, loading pattern, operator’s skills, adherence to scheduled maintenance of the machine, workshop, tools, warehouse, etc. We often see a thorough evaluation of the site conditions when a job is awarded to the service provider on an hourly cost for a certain period of time, with guaranteed availability. But such a focus is required for retail customers as 80% of the customer segment comprises retail customers for all construction machines.

**Leveraging technology:** This includes data downloading from machines, telematic operating reports, technical inspections, fluid analysis, etc. It is essential for a service provider to display value addition by analysing the data, identifying areas of improvement, and partnering with the customer in fixing the gaps.

**Training operators and technicians:** Most operators follow the basic operating methods as they are not aware of the advanced features in the machine. For example, they are not aware of the consequences of excess idle run of a machine, excess traveling of an excavator, the appropriate mode selection, gear shifting practices, engine switch on and off practices etc.

There are certain myths such as running the engine on idle means keeping less burden so the engine is extra safe. But the fact is that excess idling leads to issues like...
diesel dilution, premature wear of engine parts, unnecessary fuel consumption, etc. Another myth is that more the engine speed, more is the load it takes. But the fact is that in any engine, the torque keeps rising up to a certain speed (say up to 1500 RPM) and starts to drop when speed increases further. Technicians too need to be well trained; they must adhere to the scheduled maintenance (oil and filter change) and cleaning of the machines, oil storage and transfer etc. By training and monitoring the technicians and guiding the customer, the company will strengthen the bond between the customer and the service provider; which could lead to repeat orders from the satisfied customer.

Unfortunately, many service providers limit their customer services to scheduled calls during the warranty period and doing the documentation; they do not focus much on operational and maintenance practices. The post-mortem on the machine starts once it is down and the debate starts on who is at fault, followed by bargaining from both ends. Surprisingly, about 90% of premature failures are preventable if one has undertaken regular monitoring of the machine.

Main issues with customers and service providers:

• The service provider feels that it would cost him more to spend extra time at the jobsite
• The customer feels why should he pay service fee as long as his machine is under warranty
• The salesperson feels that adding service cost will escalate the product cost and it will be difficult to convince the customer

They may all be correct; but when all three parties focus on the core requirement, which is, asset availability and reliability, they can come to a consensus. In fact, the service fee is a very small component when compared to the benefits obtained through consistent availability and productivity of the machine. It is the responsibility of the service provider to bring some case studies on the benefits of condition monitoring, operator training, improving site conditions etc.

Service Contracts: Most of the service providers follow a pre-defined service contract model. But one must understand that a pre-defined service package is only for guidance and not necessarily to follow. Any service contract should be tailored as it is for the customer’s site conditions and infrastructure. Most importantly, the service provider must bring some value addition to the customer. A well executed service contract will make the satisfied customer to remind the service provider about renewing the contract.

A successful and effective service provider is one who identifies his customer’s needs and supports him to meet his intended purpose, which is consistency of machine availability with reduced downtime and reliability in performance.
Equipment reliability is defined as the probability that the equipment will successfully perform its intended function without failure, under specified operating environment and operating conditions, for a specified period of time. Worker safety can be defined as a function of the operating environment, the individual, and equipment reliability.

Bryan Christiansen, Founder & CEO at Limble CMMS

According to the US National Safety Council, a worker is injured on the job every 7 seconds. Times of India reports that a study by The British Safety Council concludes that there are as many as 48,000 workplace fatalities in India per year, 24% of which are in the construction industry. These numbers truly are staggering, and the worst part is that the vast majority of these incidences are very well preventable. Taking preventative action can spare workers and their families from unnecessary pain and suffering.

On the business side of things, workers’ compensation premiums and potential fines and legal fees, which correlate directly to accident and incident rate, amount to millions of dollars per year, in even a modest-sized company. Additionally, companies spend substantial resources training workers, and lost time accidents put a serious dent on those efforts.

For an additional perspective, consider the facts below:

• The average cost to industry for a fatal accident ranges from a low estimate of $1.27 million to the enormous figure of $8.6 million per fatality paid out by BP following its refinery explosion [US National Safety Council].

• The average payout cost for businesses for a permanent disability is $1.3 million, while a partial disability is $210,000 [US Air Force].

• 6 million workers suffer non-fatal workplace injuries at an annual cost of $125 billion to U.S. businesses [Occupational Safety and Health Administration] and $27 billion to Canadian businesses [Government of Canada].

• The median days away from work due to injuries and illnesses for goods-producing industries is 9 days each year, with more than 25% days-away-from-work cases at 31 days or more [US Bureau of Labor Statistics].

Whichever perspective you take, and irrespective of geographical locations, workplace accidents are extremely expensive for businesses.

Risk Identification

Universally, from a legal standpoint, employers are responsible for protecting workers from hazards involving the operation of machinery and equipment. That can be either in the form of a safe operating environment or providing workers with necessary personal protective equipment, as per prescribed codes and regulations.

Risks, or hazards, associated with working near or on machinery vary, depending on the exact equipment being used and can include, but not limited to, the following:

• Contact with or struck by moving equipment (e.g. entanglement, friction, abrasion, cutting, severing, shearing, stabbing, puncturing, impact, crushing, falling objects, drawing-in or trapping).

• Contact with pressurized gas or liquid (e.g. hydraulic systems, pneumatic systems, compressed air, paint sprayers).

• Contact with harmful chemicals or biological hazards.

• Contact with harmful noise, radiation, or vibration.

• Contact with harmful energy source (e.g. electricity, electromagnetic, heat, fire, cold).
From the list above, it is quite evident that each of the risks identified is heavily reliant on equipment and machinery health and reliability.

A few common examples of worker safety risk that is driven by poor equipment reliability are:

- Slips, trips and falls from equipment leaks and spills, temporary hoses and pipes.
- Electrocution from poorly maintained electrical grounding systems and power tools.
- Fire and explosion hazards stemming from poor configuration management and equipment maintenance practices.
- Exposure to energy sources due to failure of poorly maintained safety systems.

**Risk Assessment**

Risk is defined as the product of Severity and Probability of the injury occurring.

Severity can be determined by answering two questions:

- What type(s) of hazard is involved?
- What type(s) of injury could happen?

Probability can be determined by reviewing the equipment’s operating information such as:

- OEM safety information
- Potential human performance errors while performing these tasks
- History of equipment failure

Once risks have been identified at the workplace, risk rating should be determined for each type of potential injury by assuming no protective measures have been installed on the machine. This evaluation helps determine if adequate action has been taken to prevent injury.

**Risk Controls – Duties and Responsibilities**

Each work group within an organization, including management and leadership, have their part to play in due diligence to successfully permeate the safety culture through the business. Constructors, employers, supervisors, and workers have an equal stake towards mitigating and addressing the risk by upholding excellence in equipment and machinery reliability.

Risk mitigation controls typically have a graded approach through elimination, substitution, engineering controls, administrative controls, and Personal Protective Equipment (PPE), in order of decreasing effectiveness.

As outlined by the Occupation Health and Safety Administration (OHSA), some of the main duties and responsibilities towards upholding equipment reliability that play a key role towards risk mitigation controls for workplace injury are outlined below by work group:

**Constructors**

- Planning, organizing, and executing projects to avoid or reduce the unintended reversing of operating equipment and machinery.
- Reporting adverse field conditions, including equipment and machinery reliability issues, promptly to employer/supervisor.
Worker’s Safety

• Establishing written procedures to be adhered to during normal activities as well as during emergencies, reviewing those procedures with the project’s Joint Health and Safety Committee (JHSC) or Health and Safety Representative (HSR), as applicable.
• Conducting Pre-Job Brief and/or Job Site Drill before operating equipment and machinery for every shift change or incoming crew.

Employers
• Providing PPE, information, instruction, and supervision to workers to protect their health and safety.
• Ensuring workers are adequately trained and qualified to perform job duties
• Ensuring good housekeeping practices including, but not limited to, management of safe work areas and temporary equipment and material staging.
• Ensuring implementation of Reliability Centre Maintenance (RCM) approach to asset management; failure prevention or managed failures reduce the requirement for unplanned equipment maintenance, reducing worker’s exposure to risk.
• Ensuring required measures and procedures are carried out in the workplace, for routine operations as well as emergency protocols.
• Ensuring proper change control, configuration management, and traceability of procedures, equipment status and configuration.
• Ensuring required equipment, materials, and protective devices are provided and maintained in good working condition.
• Ensuring sufficient room is provided around equipment and machinery to safely perform work.
• Implementing Engineering Controls and Design Barriers to safety hazard (e.g. safety devices, machine guarding).
• Implementing Administrative Barriers to safety hazard (e.g. procedural control, peer review and verification).

Supervisors
• Ensuring workers adhere to required safety standards and procedures.
• Ensuring any equipment, protective devices or PPE required by the employer is worn/used by workers.
• Advising workers of any potential or actual health or safety dangers known by the supervisor through Pre-Job Briefs.
• Providing workers with any prescribed written instructions about measures and procedures to be taken for the workers’ protection, including but not limited to Safe Work Plan (SWP) and Job Safety Analysis (JSA).
• Creating standard operating procedures, preventive maintenance checklists, and other guidelines that can guide the maintenance team to do their work properly.
• Inspecting, at least once a week or more frequently, all machinery and equipment, communication systems, and means of access and egress to and from the worksite.

Workers
• Following lockout-tagout and de-energization protocols.
• Using/operating equipment in a safe manner.
• Ensuring that all cutting tools and blades are clean and sharp and are able to cut freely without applying excessive force.
• Reporting adverse field conditions, including equipment and machinery reliability issues and workplace hazards, promptly to employer/supervisor.
• Keeping and maintaining a clean job site.

Conclusion
Equipment that are designed, installed, operated and maintained properly are more reliable and less likely to fail and create a situation that could expose personnel to hazards.

One of the fundamental tenets of Equipment Reliability is Reliability Centered Maintenance which is a comprehensive life cycle asset management process that governs the entire life of operating equipment – from conceptual design through operating to decommissioning and disposal. Reliability Centered Maintenance also includes failure-prevention-driven asset maintenance plans that combine best practices in preventive and predictive maintenance that assure minimal potential for adverse events that could lead to construction workplace hazard exposure to workers and personnel.

The study by The British Safety Council also observed that as many as 38 fatal workplace accidents take place every day in the construction sector in India, and that the fatality rate is 20 times higher than that of Britain, noting that India is currently in a similar position to where Britain was 50 years ago in terms of accident rates at work.

An equipment reliability centered maintenance approach to safety and health program protects assets as well as construction progress. It returns a consistent and predictable result within specified control limits, and has the potential to end age-old conundrum of productivity versus safety conundrum, and can fast-track the move towards a safer construction workplace without compromising project success.

*(Limble is a modern, easy to use mobile CMMS software that helps managers organize, automate, and streamline their maintenance operations)*
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Incorporating passive techniques in building designs is becoming essential as they help in reducing the thermal cooling loads of buildings to maintain indoor temperature. These techniques can also be used for low- and mid-income housing groups, and for the economically weaker section (EWS) to provide better and more comfortable living standards.

Warm humid region climate is categorized by heavy rainfall and high humidity thus it is essential to provide maximum open spaces to allow cross ventilation. By using these strategies in housing, energy demand can be reduced by 25%-35%, thus making building energy-efficient. It is necessary to incorporate passive techniques in designing of houses in a sustainable and cost-efficient manner.

Sustainable building techniques make a valuable contribution to sustainable development (Akadiri et al. 2012). Environmental evaluation and energy performance audit of buildings are becoming important parameters for sustainable design or green architecture (Ghaffarianhoseini et al. 2013). The sustainability of a structure is influenced by the materials used, technology and affordability. The aim of these buildings is efficient use of energy, water, and other resources, and improving the user's productivity (Singh et al. 2010).

In sustainable designing of multi-story buildings there are four main strategies:

- Passive solar gain
- Active solar gain
- Active wind gain
- Facade designing.

Passive solar means building orientation according to the sun, while active solar involves appliance of photovoltaic cells. Elevation design along with considering building facade also acts a source for internal heat gain, thus appropriate materials should be used to maintain the thermal comfort (Wang and Adeli 2014). Following are the advantages of sustainable designing:

- Minimizes operational energy, water requirements and thus less waste generation.
- Utilizes locally available materials making it cost-effective.
- Involves passive techniques to attain comfortable indoor environment and a healthy workspace.
- Structure life is also increased (Radwan et al. 2015).

Depending on the climate, size of the house and development level, energy requirement varies. Construction projects consume 38% of the total energy annually (Yüksek and Karadayi 2017). The main usage of energy in a building is lighting, heating, cooling, ventilation etc. It is also consumed during production of materials (embodied energy), so there is a need to conserve energy during construction through appropriate designing, proper orientation, building form, knowledge of climatic conditions, site planning, use of renewable resources, and achieving thermal comfort (Thapa and Panda 2015).

Energy usage can also be reduced by using materials with low embodied energy like fly ash bricks; fiber reinforced bricks; timber and adobe bricks. Cost can be minimized using solar water heater or photovoltaic cells on the roof (Chel and Kaushik 2018). Various policies such as Green Rating Integrated Habitat Assessment (GRIHA) developed by The Energy and Resource Institute (TERI) and the Ministry of New and Renewable Energy and Leadership in Energy and Environment Design (LEED) operated by the Indian Green Building Council (IGBC) with National Building Code (NBC), Bureau of Energy Efficiency (BEE) and voluntary green building rating systems (Sharma 2018), have been already initiated in the construction sector.
Warm-Humid Climatic Region

India is divided into six different climatic zones as shown in Fig. 1. Warm humid region is comparatively high temperature region (30°C-35°C), heavy rainfall and relatively high humidity all over the year. The temperature remains the same throughout the day with light winds. The intensity of solar radiation is also high with heavy precipitation and humidity levels (Conservation and Code 2007). Temperature, humidity and wind are the main elements in a warm-humid climatic region, which effects thermal comfort of dwellings. As the low-income group (LIG) and the middle-income group (MIG) cannot afford mechanical cooling to maintain the internal temperature, passive techniques are effective measures to have an energy efficient building with economical annual cost (Roux 2015).

Affordable Housing

There is a massive shortage of affordable housing in India. With the rise in economy, energy consumption in households is also increasing. Air conditioning units, operation and maintenance add to the building cost. In Affordable Housing, the building allows natural ventilation to maintain a comfortable internal temperature and reduce consumption of energy, as compared to commercial and institutional buildings (Sen 2014). The division of household according to JNNURM mission directorate (2011) is shown in Table 1 (TERI 2014).

Passive Strategies and Climate Responsive Design

To enhance the indoor temperature, insulation is required in walls and roofs. The shading of windows by overhangs and side fins and using energy efficient materials in construction are also needed (Kini et al. 2017). Buildings are placed in a scattered manner to allow air movement needed in warm-humid regions. Large openings are needed both in the plan and elevation; placement of bedrooms should be on the east side (Factors Governing the Design Aspects of Sustainable Building in Different Climatic Zones 2017). The studies are given in table 2.
Construction of Roof

The construction of roof using traditional techniques and materials is shown in Fig. 2 (Pingel et al. 2019).

Building Materials for Walls and Roofs

Hollow Concrete Blocks are economical, environment friendly and low maintenance, and have good thermal insulation, fire resistance and load bearing capacity. Also, their strength can be specified according to the site requirements (Fig. 3) (Chaure et al. 2018).

- Timber has good thermal resistance, high heat storage capacity, and good regulation of humidity as a warm-humid region has high moisture content (Fig. 4) (Harte 2018).
- Bamboo Roofing Sheet is a successful roofing material as it has almost similar tensile strength as that of steel. It is eco-friendly, lightweight, tough and long-lasting and has minimum fire hazard (Refer Fig. 5) (Chowdhury and Roy 2013).
Ferrocement is made up of cement mortar and wire mesh reinforcement. As it is thin in section it has less steel, and a lower embodied energy. It is strong, durable and cost-effective and used in the construction of hollow columns, walls, beams and for repair of deteriorated structures (Deshmukh, 2013).

Laterite stone is commonly used for low-cost constructions in Kerala, Karnataka, Goa and Andhra Pradesh. Usually plastered with lime mortar, it gains strength on exposure to air and sun (Fig. 6) (Maklur and Narkhede 2018).

Mangalore tiles are cheap, durable, and eco-friendly. They are used in roofs, applied in kitchens and bathrooms, to remove smoke through air gaps in between the tiles. They are made up of laterite clay and placed over sloping roofs in places that experience heavy rainfall (Fig. 7) (Sarathraj and Somayaji 2014).

Coconut palms are used as a vernacular building material in Tamil Nadu and Kerala as they are available in large quantities, cheap, and used for making thatch and mats from woven leaves. Being eco-friendly, they are suitable for warm humid regions (Fig. 8) (Killmann, and Fink 1996).

Adobe brick is made up of sand, clay along with chopped straw, and moistened with water. For strength, cow dung is also added. It is then dried in the shape of a brick. It is eco-friendly, provides thermal comfort, low maintenance and cheap. It is used in construction of foundations, walls, door, windows, beams and roof (Fig. 9) (B. 2014).

Rat Trap bond is a masonry technique with cavity inside the wall. It requires brick as a building material. Along with the thermal load reduction it also saves the electricity usage (Refer Fig. 10) (Ullah et al. 2018).

Stone is the most ancient building material available in the form of blocks and can be cut into various sizes for construction of foundations, walls, columns, lintels, pavement of roads. They are durable, strong and economical (Fig. 11) (Balasubramanian 2017).
Raw Earth as a building material

The Auroville Earth Institute and Centre for Sustainable Research (CSR) aims to build a link between raw earth as a building material with modern technologies. It has developed new techniques that save energy, is environment-friendly and feasible. It focuses mainly on reduction in the usage of steel and cement. Compressed earth blocks are most widely used as a building material in Auroville (Refer Fig. 12) (Auroville’s Case study). To prevent water erosion it is stabilized with 3-5% cement. The material is durable, ecological, cheap and requires easy workmanship. Most of the construction in Auroville demonstrates this through vaulted floor and roof designs. (Bhatia, B. 2014).

The Auram Press 3000 can create 80 types of blocks with 18 moulds. They are compressed in a press (manual or motorised) and cured for 28 days.

Challenges in building with passive strategies:
• With fresh or renovated construction, early expenses of installation can be 10%-30% higher.
• Climatic conditions may change the performance.
• Exterior environment makes a difference in design.

Conclusions
Climate responsive architecture helps in maintaining the indoor environment quality and helps us adopt traditional building methods using materials like laterite blocks, hollow concrete blocks, hollow clay blocks along with some energy-efficient passive design strategies. These strategies are a good alternative for artificial cooling methods and are cost-effective. Thus, it should be made mandatory for all the planners to incorporate passive strategies and make buildings energy-efficient.

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Unlock 1.0: Atlas Copco India in Active Mode

Tony Van Herbruggen, General Manager, Power Technique Business Area, Atlas Copco India, gives his views on steps to be taken to resurrect the Construction & Infrastructure business amidst the Covid-19 pandemic.

This is an exceptional year for the construction business as the impact of the pandemic on the various inter-related industries is being felt worldwide. The cost of project implementations may go up and developers are likely to experience delays of several months. However, Unlock 1.0 has provided some relief in re-starting stalled projects.

Priority should be given to completing pending projects and to projects nearing completion. On the bright side (keeping all the hurdles aside), the lockdown has enabled the construction industry to work on projects that were difficult to conduct during the pre-Covid days due to the intense daily activities. For instance, many roads and highways could be completed as there was little or no traffic during the lockdown period.

At Atlas Copco, we continue to focus on ensuring the safety of our employees and our customers. We have taken the necessary steps for social distancing and maintaining hygiene at our Chakan and Dapodi production facilities in Pune. As manufacturers of world-class portable air compressors, light towers, and handheld tools, we maintain the highest quality standards for our equipment, so that every product of Atlas Copco can meet the high-performance level that our customers have come to know and expect.

Besides this, our service team follows strict pre-defined SOPs during onsite visits to ensure that our portable air compressors and light towers are always up and running. We also manage service requests remotely, wherever possible, with our Power Connect mobile app. This is designed to provide online support to customers looking for parts, and even provides step-by-step assistance for any troubleshooting.

We are confident that the Construction & Infrastructure sector of India will contribute towards reviving the country’s economy. We look forward to the Government’s support in kick-starting the projects to meet the infrastructure needs of the people. We expect a staggered growth in the short term, but we anticipate stability and a growing industry demand in the long term. The relief packages introduced by the Government will also help in boosting the economy and provide a positive direction to the construction industry.

Hyundai Construction Equipment completes construction of Technology Innovation Center

Hyundai Construction Equipment held the completion ceremony for the Technology Innovation Center in Yongin, Gyeonggi-do, on October 26, 2020, with CEO Kong Ki-young and executives and employees in attendance. Construction of the Center that started in September 2019, was completed by establishing the reliability assessment building and the performance evaluation laboratory for finished equipment on a total land area of 40,000m² (12,200-pyeong), with a total investment of KRW 77 billion.

Hyundai Construction Equipment’s new “Technology Innovation Center” will be the cradle of quality innovation and will pave the way for strengthening brand reliability. It will accommodate 16 laboratories with about 100 research personnel to carry out quality research and verification from parts to finished equipment.

In particular, Hyundai Construction Equipment has established the integrated control system office combining cutting-edge ICT technology inside the Center in order to monitor the existing durability center in Gunsan and the laboratory and testing ground for social distancing and maintaining hygiene at our Chakan and Dapodi production facilities in Pune. As manufacturers of world-class portable air compressors, light towers, and handheld tools, we maintain the highest quality standards for our equipment, so that every product of Atlas Copco can meet the high-performance level that our customers have come to know and expect.

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“We should never compromise when it comes to investments in quality innovation, even during the recession. Instead, we should strive to make a sharp improvement in quality from the development stage so as to repay our clients for their trust,” said Kong Ki-young, CEO of Hyundai Construction Equipment, during the ceremony.
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Sany India Celebrates 15000 Machines Milestone in India

Sany India, which offers end-to-end solutions for infra construction with its advanced range of equipment and technologies, rolled out its 15000th machine from its facility this month. In catering to the indigenous construction sector, Sany India has further strengthened its position in terms of product offering as well as market reach, having expanded its network to 36 dealers and over 150 customer touchpoints across India and South Asia.

Said an elated Deepak Garg, Managing Director, Sany India & South Asia, “Rolling out the 15000th machine is a remarkable achievement that reaffirms our commitment to the domestic construction equipment market, which has a strong growth potential. It also encourages us to continue adding new technologies to our upcoming product range and delivering the most modern construction equipment and heavy machinery solutions.”

For Sany India, localization has been a prime focus since it started manufacture of concrete equipment in 2009. It has now come a long way from manufacturing three models of excavators in 2014 to 16 models, and 7 models of truck cranes in India. The company has also localized its concrete boom pumps, transit mixer trucks, and trailer pumps. Today, it manufactures around 45 models of construction equipment at its Indian facility.

Cat NextGen Excavators Day

Gmmco Ltd and Caterpillar Inc., along with their customers, celebrated the Cat NextGen Excavators Day recently. The event, which was hosted online, got an enthusiastic response from customers. Cat NextGen Excavators Cat 323D3, Cat 320D3 and Cat 320D3 GC were showcased along with their key benefits and features.

Said V. Chandrashekar, MD & CEO, Gmmco, “We have a range of Cat NextGen Excavators from Caterpillar that includes the 30-ton, 45-ton, 70-ton and 95-ton class, and have now added one more model of the Cat 20-ton to meet customer requirement.”

Prashant Harisingh Bisen, Senior VP - Construction at Gmmco, commenting on the company’s sales and service offerings, said, “Our products are bundled with value-for-money offerings such as equipment protection plans, extended warranty, product support and finance schemes at competitive interest rates. We have positioned our service engineers close to our customers and we guarantee service response times.”

Gmmco has been selling Cat NextGen Excavators since 2018 and now supports over 500 of these 20-ton excavators. The company also felicitated the owners of Cat 320D3 GC during the event.

L&T starts construction work on 10-acre realty project

Larsen & Toubro has started construction work of its prestigious project North Towers at its residential project - Seawoods Residences in Navi Mumbai area of the metropolitan city. The project is a part of India’s first Transit-Oriented Development (TOD) – Seawoods Grand Central conceptualized on the lines of the world’s best TODs.

Cabinet clears ₹1,251-cr twin towers in Bangaluru

The State Cabinet in Bengaluru has approved the construction of twin towers, housing government offices at Anand Rao Circle at an investment of ₹1,251 crore. The proposed buildings would come up on the PWD land with a plan to provide skywalks from three metro stations located in the vicinity on PPP model.

Shapoorji Pallonji pushes co-living realty projects in Maharashtra

Shapoorji Pallonji Real Estate has planned to foray into diversified portfolios and capitalize on an alternative asset class targeted at millennials relying on renting instead of owning homes. CEO, Venkatesh Gopalkrishnan, informed that the group firm, which builds luxury to mid-income homes, will build the co-living projects in Pune and Mumbai Metropolitan Region.
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Connecting the Entire Value Chain of Elevators and Escalators in India

Over the years, the IEE Expo has positioned itself strongly as a networking and sourcing platform for elevator and escalator industry professionals, and where buyers can witness the latest technologies and conveniences that modern elevators are offering to meet the evolving demands of the users.

The pandemic affecting the real estate sector created a domino effect on the elevator and escalator industry as it is one of their key buyers. But the recent situation has also compelled the industry to manufacture a variety of gadgets and innovative solutions that will soon become the new norm considering the changing demands of modern infrastructure.

As per reports, the industry is poised to grow by USD 659.2 million during 2020-2024, progressing at a CAGR of over 9%. Touch-free buttons, gesture and voice activated sensors, sanitising systems, online or remote-controlled maintenance systems will no longer be an option of luxury but an integral part of everyday life. Factors like large-scale metro projects, steady growth in high rise buildings, commercial complexes, and need for urbanisation will continue to augment the demand for elevators and escalators in the country.

Over the years, the International Elevator and Escalator (IEE) Expo has been instrumental in providing quality solutions to the industry stakeholders, enabling them to explore new tie-ups, and find suitable partners to source components and end products.

Buyers from 27 states and union territories visited the last edition of IEE Expo in 2020, clearly indicating that the exhibition is a one-stop sourcing destination where one can meet industry experts from all over the country. Held in Mumbai, it witnessed visitors from Gujarat, New Delhi, Telangana, Karnataka, Goa, Rajasthan, Tamil Nadu, West Bengal, Assam with 3,591 buyers from Maharashtra itself.

The event saw live demonstrations of technologies like solar ELOS (a type of solar generator for elevators), hydraulic elevators for passenger and goods, pneumatic vacuum elevators and smart elevator control panels with cloud and advanced components. The show helped suppliers and manufacturers to build business connections with their targeted audience as a majority of the buyers belonged to the elevator installer sector (17%), elevator/escalator manufacturers (16%), maintenance and repair (11%), component manufacturers (10%), along with other important buying segments like builders/developers, architects, rail and metro authorities, city planners, etc.

IEE Expo’s influence on the elevator and escalator industry is evident as it sees strong support from industry associations and government bodies like the Ministry for Housing, Government of Maharashtra, National Buildings Construction Corporation (NBCC), Indian Electrical and Electronics Manufacturers Association (IEEMA), Mumbai Metro Rail Corporation (MMRC), Maharashtra Chamber of Housing Industry-Confederation of Real Estate Developers Association of India (MCHI-CREDAI), All India Lift Upliftment Federation, and Gujarat Elevator Industrial Association. Its partnership with CREDAI-MCHI attracted many real-estate moguls to witness the latest trends of elevators for their upcoming building projects.

With so many advancements entering the market, it is crucial for buyers to personally witness the benefits these technologies can provide to enhance modern infrastructural development. The show that is known to provide first-hand experience of the latest trends in elevators, escalators and components has successfully managed to keep the industry close-knit with 6,49,080 second degree connections.

The next edition of IEE Expo will be held from 16 – 18 February 2022 at Bombay Exhibition Centre, Mumbai. IEE Expo is a part of the Building Technology segment that also hosted the E2 Forum in India. The globally renowned conference was supported by a powerful advisory committee that comprised of decision makers from leading elevator and escalator OEMs like Bharat Bijlee, Kone Elevators India, Fujitec India, and Thyssenkrupp India, along with key real estate players Ajmera Realty & Infra Ltd and the Runwal Group, apart from industry partner MCHI-CREDAI.

IEE Expo has delivered 8 successful editions in the past and each new edition will continue to be a source of information on the latest products and technologies. Its advisory board conceptualises themes that are future-oriented, relevant to the changing times, and of benefit to buildings of all types and sizes.

For more information about the event, please contact:
Mob: +91 9619403778
www.ieeexpo.in.messefrankfurt.com
Will it be Springtime for the CE Sector?

As we bid adieu to 2020, the current demand for CE products and services is in a sweet spot; but the sector’s firming up will be critical for ushering in sustainable growth. A lot will depend on the marketing activities to take the sector out of its recent gloom, observes S.K. Khanna.

There could be unexpected spin-off benefits for the domestic Construction Equipment (CE) Sector as tension mounts between India and China in the border areas, resulting in increased sales of the products and services for the CE companies. As per reports, there has been more than 50 percent rise in the sales of equipment, and overall, a marked increase in the offtake of equipment during the last 3-4 months following heavy spending by the government on infra projects, which had identified 73 strategic roads totaling 4,000 km and related infra such as tunnels, bridges, and airfields.

These developments are giving a push to the sales and marketing of equipment and services; in fact, the momentum is likely to go beyond the current transitory period as the government focuses on quick implementation of important projects. These projects have the potential of adding 3-4 percent of GDP and providing over 10 million jobs and boost the business potential of various sectors of the economy, besides the CE sector.

The Mood is Optimistic in Important Quarters

CIDC expects the optimism to prevail. The government’s Stimulus Package 3 is expected to stimulate a large demand for cement, steel, and allied products, which will be processed by the CE sector for deployment in ongoing infra projects as well as upcoming ones. It is strongly felt that infra projects could be the antidote to the current economic contraction as they have a multiplier impact across the board.

JCB India’s Deputy Chief Executive, Deepak Shetty, opines that the market trend is very encouraging for equipment companies. Demand has recovered from the prolonged lockdown phase, driven by flagship government schemes and through the government’s heavy spending on construction and activities under PMGSY and MNREGA. During July-August, JCB witnessed a “y” shaped recovery in the deployment of its products and services, which has given the company renewed confidence in better times ahead.

Indian Construction Equipment Manufacturers Association’s (ICEMA) President & MD Tata Hitachi, Sandeep Singh, agrees that better days lie ahead as the government is serious about completing stalled and ongoing projects without any time lag, for the benefit of the country’s economy. Infra projects will lift the demand and supply of construction equipment and services appear to be good due to the reasons stated. The developments will boost several other sectors of the economy, and eventually boost the commercial market and help create new jobs - both direct and indirect.

A FICCI report states that the Indian manufacturing sector is poised to witness a recovery in the next few months with the rise in percentage of respondents reporting higher production.

Economy on the Mend

According to ICRA, the economy may have contracted but improvement has been seen during the last two quarters led by growth in sectors like power, mining, and construction, supported by fiscal and monetary measures.

With Stimulus 3 on the cards for a Rs1.454 crore boost for manufacturing and a further 7 lakh crore (or 3.5 percent of GDP), the economy is on its way to mend. So far, the Centre has provided a stimulus of Rs 29.9 lakh crore (since the lockdown in March ’19). The government has announced a fresh set of measures with an estimated outgo of Rs 1.2 lakh crore to boost demand, help create jobs, and augment the country’s infrastructure. These developments were held well for various sectors of the economy.

A Resilient CE Sector

It is to the credit of the domestic CE sector that despite a long spell of slowdown in business activities, it continued to launch new products and undertook marketing initiatives to bolster its image both within the country and outside. It, thus, (also) laid stress on its ability to achieve world-class quality benchmarks and ensure timely delivery of its products and services, even on the face of a disrupted supply chain.

No summer or winter lasts forever, and no spring skips its turn. It could be springtime now for the CE sector, but the second wave of Covid-19 remains a potential risk. With some luck, the Covid-19 crisis could prove to be a short setback to the emergence of a strong economy, but we have to maintain a balance between optimism and caution, and between exuberance and practicality.
The Confederation of Indian Industry (CII) has announced the 11th edition of EXCON, India's premier and South Asia's largest construction equipment and construction technology trade fair. It will take place in Bengaluru from December 7-11, 2021. The key focus will be Atma Nirbhar Bharat, Fuel Legislation (BS-IV transition), Alternate Fuels, AI, IoT and Robotics, gender diversity in construction awards, greater participation of Academia & Defense, State Sessions, MSMEs and Digital Transformation.

The event will feature a 5-day international exhibition across a display area of 3,20,000 sq.m. It is expected to attract over 1300 exhibitors, which will include 400 companies from abroad (representing 6 country pavilions from Germany, Italy, Turkey, South Korea, UK and China), and over 60,000 business visitors from India and abroad.

Arjun Ram Meghwal, Union Minister of State for Parliamentary Affairs and Heavy Industries & Public Enterprises, Government of India, who launched the event, said that the Construction Equipment Industry has tread the growth path in the last quarter and EXCON 21 is another testimony to the confidence on the recovery of our economy, faith in controlling the pandemic and the vaccination plans of our Government, and the various progressive initiatives and policies taken by the Government for developing the infra sector.

The Minister informed that an area of 325 acres has been earmarked at NATRAX - Automotive Testing Center in Indore for Testing Construction Equipment Machinery and urged the CE Industry to make use of the facility. He further said that the Department of Heavy Industry has been instrumental in setting up Capital Goods Skill Council. Through this organization National Skill Standards are being notified with the purpose of defining skill needs of the industry. This way, training institutions will be able to impart skills which are valued by employers in the Industry. The Council has been targeted to benefit 10 million people.

He added that Prime Minister’s key economic advisory has proposed an investment-led stimulus by the government to help revive the economy. The proposed massive spending on infrastructure, along with an upgrade of urban facilities, mainly, highways, renewable energy, and urban transport. All this is expected to create durable assets and jobs, and generate demand for Materials, Technology and Aggregates.

Deepak Shetty, Chairman, EXCON 2021 and MD & Deputy CEO, JCB India Limited, said, “EXCON is happening at a time when our economy is on the path of transition towards a ‘New India’ and there is renewed confidence about the future. India has stood true to its growth promise. The economy has added $1 trillion during the past five years. EXCON plays the role of creating synergies for the overall development of the Indian economy on one hand and increase in trade and investments globally on the other.”

“With sustainability and the environment being major concerns, the Government and industry are taking measures and innovative steps to ensure a sustainable and eco-friendly development of the country’s infrastructure. Interactions at EXCON are being planned around topics which cover these aspects in detail. For the Construction Equipment Industry, the existing challenges are opportunities which the industry can take on and emerge stronger,” he added.

Amit Gossain, Chairman, CII Urban Development & Smart Cities Council, and Managing Director, Kone Elevators India, said, “India requires investment worth Rs 50 trillion (US$ 777.73 billion) in infrastructure by 2022 to have a sustainable development in the country. India is witnessing significant interest from international investors in the infrastructure space. EXCON has grown and evolved with the changing times, and is seen as an ideal platform for all the stakeholders from the Construction Equipment sector to come together under one roof and deliberate on new ideas and form new alliances.”

EXCON has been playing a catalytic role in showcasing innovations in the Construction Equipment and related industries that are supporting infrastructure development across the country. The event is a platform that connects all infrastructure stakeholders, including policymakers, investors, and developers, to be a part of the growth story. Following to huge success over the last 10 editions, the event has come to be ranked amongst the top 10 construction equipment exhibitions in the world.

EXCON is both a marketing and an educational platform. Government and senior bureaucrats capitalize on the knowledge sharing opportunities for the benefit of various departments like the PWDs and Civil Engineering. Here, private contractors, builders, road and infra developers, Smart City/Urban Planners, the Army and Border Roads Organization, etc. can witness the latest Technology, Equipment, and Machinery to enable them to undertake accelerated infra development.
“Government of India’s ambitious ₹111 lakh crore National Infrastructure Pipeline (NIP), which has already been announced and actioned upon, augurs very well for enabling sectors such as the Indian Construction Equipment (CE) industry,” stated Shri Nitin Gadkari, Minister of Road Transport & Highways and MSME, while unveiling the Indian Construction Equipment Industry Vision Plan 2030 “Building the Nation” through an online platform. He urged Cooperation, Coordination and Communication with all stakeholders to improve product quality, drive innovation, and make the CE industry globally competitive.

The Minister pledged his commitment to support the interests of the Indian Construction Equipment industry and commended iCEMA and its members for their efforts in creating an action-oriented plan for growing the CE industry by three times the current size in the next 10 years. He informed that the Government is continuously working towards providing world-class infrastructure across the country and urged the CE industry to capture this opportunity. He also stressed the need for more productivity and cost efficiency to serve the needs of the growing Infrastructure sector.

Gadkari emphasized that product quality along with cost competitiveness will enable the Indian CE industry to successfully participate in global export markets for construction equipment. He urged the industry to consider partnerships with leading academic and technical institutions such as the IITs and set up research centers to learn from and accelerate adoption of international best practices and technology. In his view, the industry needs to undertake R&D and drive innovations continuously to be at par with technologically advanced international brands. He gave instances of evaluating alternate fuels and how the Ministry along with NHAI has driven several innovations in the construction of roads and highways.

According to him, CE companies need to carefully evaluate localization opportunities for both imported equipment as well as components to drive the Government’s Atmanirbhar agenda; and the need to be innovative on all dimensions of business, especially new business models and lucrative financing structures, which will lower the industry’s cost of investments.

Sandeep Singh, President, iCEMA & Managing Director, Tata Hitachi Construction Equipment Machinery India, outlined the Vision Plan that includes sustained demand, creation of a stable operating ecosystem; and building a strong foundation for technology and skilling as the three pillars for the growth and development of the CE industry. “With the right kind of industry and Government partnership we can become the fastest growing and second largest CE Industry in the world,” he stated.

iCEMA members also took up the issue of the sharp increase in steel prices, which has adversely impacted the cost competitiveness of OEMs as well as the vendors that are largely MSMEs. This increase in raw material costs is leading to escalation of project costs, therefore there is an urgent need to address this issue. The Hon’ble Minister said that he was fully aware of this and has brought it to the attention of the Hon’ble Prime Minister.

iCEMA also requested for inclusion of the CE Industry in the Production Linked Incentive (PLI) scheme, which will give a big boost to the Industry and its stakeholders. iCEMA members opined that this, together with many other recommendations in the Vision Plan, will propel India to becoming the 2nd largest CE market in the world and also the fastest growing in the next ten years.

Arvind K Garg, Immediate Past President, iCEMA & Executive Vice President & Head Construction & Mining Machinery, Larsen and Toubro, presented key highlights of the report. Dimitrov Krishnan, Vice President, iCEMA & Managing Director, Volvo Construction Equipment, thanked all the members for their inputs and collaboration for putting together this important document for the CE Industry.

iCEMA envisages the Indian Construction Equipment industry to achieve this vision through an action-oriented 8-point agenda that has been drawn up in consultation with BCG. It will work towards implementing the agenda with the participation of key stakeholders, including the Government of India.
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