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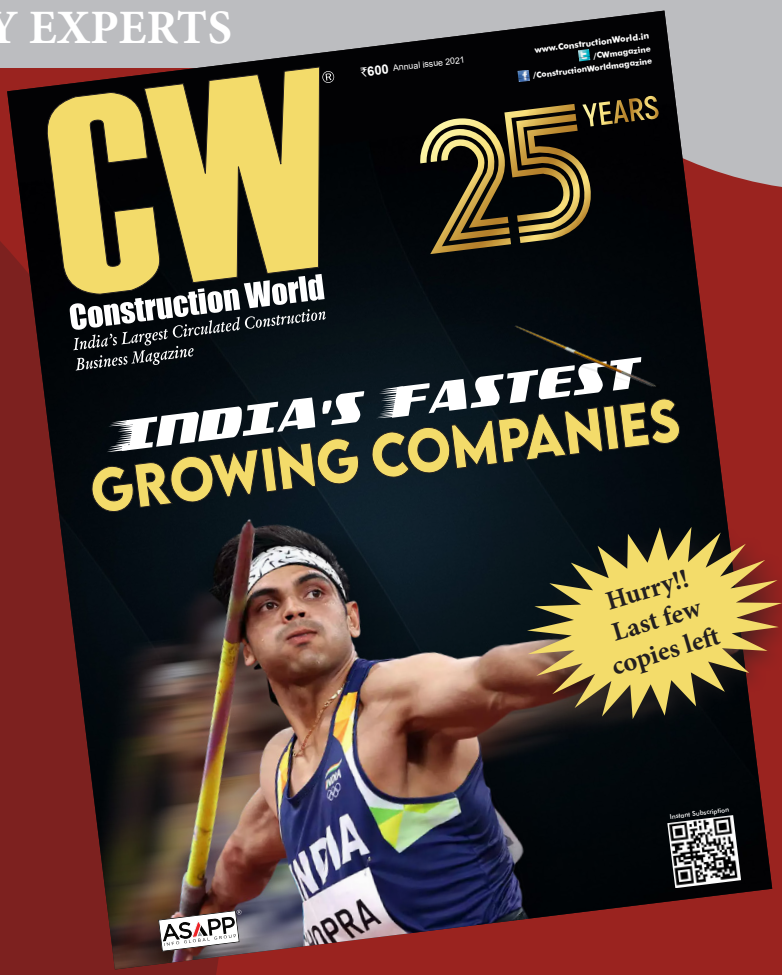
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- Profile of Construction World person of the year

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Equipment INDIA

Founder & Editor-in-Chief
Pratap Padode

Group Managing Editor
Falguni Padode
Email: Falguni@ASAPPinfoGLOBAL.com

Members – Editorial Advisory Board
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Member - Advisory Board
KGK Moorthy
Email: KGK@ASAPPinfoGLOBAL.com

Sr. Sub Editor
Karthik Muthuveeran
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For Advertisement
Adsales@equipmentindia.com

Mumbai
Dipti : +91 84228 74027

Delhi
Sanjay Jain: +91 8422874040

South
Sudhir Patton : +91 84229 87406

Pune
Nilesh Guhagarkar: +91 84228 74036

Ahmedabad
Sunil Anand: +91 84228 74011

Kolkata
Abhijit Saha : +91 84228 74022

Subscription
Sub@EquipmentIndia.com
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NIP CAN MAKE CE TICK



As per the ICEMA report, the Indian construction equipment (CE) industry has experienced a 23 per cent drop in sales at the end of the third quarter of the current financial year (Q3FY22) compared to Q3FY21. This is on the back of a slowdown in construction activity across the country. A notable decline has been witnessed in the growth of earthmoving equipment, material handling equipment, and road CE by 27 per cent, 23 per cent and 38 per cent respectively in Q3FY22 vis-a-vis Q3FY21.

The CE sales suffered on account of multiple factors, the most noteworthy being the significant slowdown in road construction activity hitting a four-year low of 21.3 km/day over the period April to November 2021 as compared to 25.8 km/day in the same period last year. Minister Nitin Gadkari recently acknowledged that the current pace of constructing 8045 km until February 2022 works out to 24.08 km a day, compared with the targeted 40 km/day, or 14,600 km for the full year. The construction bans from CAQM (Commission for Air Quality Management) in Delhi NCR and extended monsoon in some parts of Southern and Eastern regions of the country adversely affected the growth in the third quarter in particular.

On a quarter-over-quarter basis, the CE sales grew by 6 per cent in Q3FY22 vs Q2FY22. This is much lower than the 47 per cent growth recorded in the previous quarter (Q1FY22), which was very subdued due to the impact of the second wave of the pandemic. The overall sales of the CE industry in the Q3FY22 stood at 22,630 units, up from 21,323 in the previous quarter (July-September 2021). This growth was mainly led by accelerated sales of concrete equipment (31 per cent growth) and material processing equipment (23 per cent), while earthmoving equipment also showed a positive 4 per cent growth for the third quarter ending December 2021.

Despite several challenges, the CE industry [going forward] could maintain a positive growth trajectory. With the Indian government recently boosting the National Infrastructure Plan (NIP) along with other investments in the infrastructure segment in a renewed push towards 'Atmanirbhar Bharat', the forecast for 2022, therefore, opens up exciting investment opportunities in construction stocks with a medium to long-term horizon.

The various factors supporting the revival in the CE industry are a sharp increase in the awarding of road construction; reignited focus on rural infrastructure; strong rural volume off-take for equipment; and improving demand from railway and mining segments. Demand has also been supported by steady inflows from the government on infrastructure spending, particularly on roads, even though state infrastructure expenditure has been severely curtailed and diverted to the pandemic management. The BSIV mandate took a toll on OEMs but also threw a new opportunity for them to tap the European and the US markets, which require strict emission standards.

With over 35 per cent y-o-y increase in the capex and a proposed infrastructure spend of over Rs 10 trillion in Budget 2022-23, the Union government has reinforced its commitment to using infrastructure as a force multiplier for sustained economic growth.

The PM Gati Shakti plan announced last year will give a new direction to the development of modern infrastructure through planning, implementation, and monitoring, besides cutting down on time and cost overruns of projects. Gadkari has also asked the



corporates to partner with the government and increase investments and contribute to the development of the country.

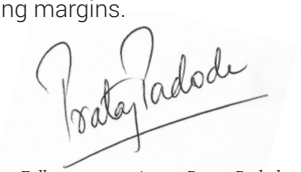
The slew of infrastructure development plans announced by Union Finance Minister Nirmala Sitharaman included, amongst others, a 25,000 km expansion in the existing network of national highways and the development of four multimodal logistics parks, 100 cargo terminals, and eight ropeway projects under the Parvatmala scheme. Budget for 2022-23 has allocated Rs 1.99 trillion for the Road Transport and Highways Ministry. Of this, Rs 1.34 trillion will be allocated to the National Highways Authority of India (NHAI).

The water and effluent treatment business category has been a unique vertical that has seen L&T secure a slew of orders ranging from Rs 25 billion to Rs 50 billion on a DBOT (design build operate transfer) basis. The aggregate scope of work comprises design and construction of raw water intake systems, storage and sedimentation tanks, water treatment plants of a total capacity, clear water reservoirs with pumphouse, supply and laying of transmission pipelines, and associated electromechanical and instrumentation works. The project also involves automation works that include measurement of inflow and outflow of water quantity and quality through suitable SCADA and other instrumentation works.

The use of alternative sources of fuel and power within the construction industry is increasingly established and, in some cases such as hydrogen, is growing at pace. As governments step up their drives to decarbonise their environments and economies, many OMEs are making fuel breakthroughs with their new machinery and, switching their focus from diesel too, for example, methane, ethanol, lithium batteries, and hydrogen. At least two companies have already recently taken the plunge by progressing with their hydrogen-powered equipment – Hyundai CE and JCB.

The electrification of construction vehicles is being led by the small compact machines including mini-excavators, small wheel loaders and dump trucks; primarily because these machines are deployed in urban environments, and cities are increasingly looking to lower exhaust emissions and noise. Their use in smaller projects means their daily duty cycle is lighter than larger machines, meaning the power demand can be met with a practical size of li-ion battery and electric motor. OEMs are already recognising that powertrain electrification is set to become a key zero-emission technology for the future. Volvo has recently launched five electric models–three excavators and two loaders–for the global market. These are available in Europe and are expected to be launched in India but the business model would have to be evaluated due to higher cost impact. Schwing Stetter plans to offer electric versions that are used in tunnels where exhaust fumes need to be reduced. Supply chain needs are likely to be altered as the volumes around electric ramp up.

Going forward, the Indian CE market will continue to be driven by road construction, irrigation, mining, and new additional verticals like water and waste treatment among others. Concerns hover around the Centre's resolve to continue government spending as targeted and its initiatives in raising funds through divestment and other asset monetisation interventions. The other concern is the surge in costs in metals, fuel, logistics, labour and probably now finance too. As long as the Government spending comes through, the rest would get adjusted during the year albeit at the cost of depleting margins.



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CASE named in The Economic Times Best Brands 2021 in India

CASE Construction Equipment, a brand of CNH Industrial, is featured as one of the Best Brands in India for 2021 by The Economic Times.

CASE India has been working consistently towards excellence, demonstrating its capacity to evolve with the times, always remaining close to its customers with solutions that meet their needs, and developing new ways of interacting effectively with them in an increasingly digitised economy. CASE has significantly grown in the Indian market, becoming one of the most desired construction equipment brands by serving its customers with world-class equipment produced at its manufacturing plant in Madhya Pradesh, India, and a constantly expanding portfolio of digital services. With the construction equipment industry rapidly changing, the coming year will be driven by numerous new infrastructure projects.

Elated by the news, **Alok Jha, Director - Sales & Marketing, India and SAARC, CASE Construction Equipment,** said, "It is indeed a proud moment for CASE India to be included in the list of Best Brands 2021 by The Economic Times. This milestone is a testimony of



consistent delivery of excellence by our employees and stakeholders and of our customers' trust. I would like to thank ET Best Brands for this honour. We look forward to many other thrilling breakthroughs in the future."

The Economic Times Best Brands initiative, now in its 4th edition, recognises brand excellence in different sectors.

Escorts Q3 standalone profit up 14 per cent

Escorts reported standalone quarterly profit of Rs 201.5 crore in quarter ended December 2021 up by 14 per cent as against a profit of Rs 176.7 crore in sequential quarter and down by 28.2 per cent as against a profit of Rs 280.7 crore in the corresponding quarter.

Revenue from operations at Rs 1,957.5 crore in quarter ended December 2021 was up by 17.8 per cent as against Rs 1,662.3 crore in sequential quarter and down by 3 per cent as against Rs 2,017.4 crore in the corresponding quarter. EPS reported at 15.33 as against Rs 13.39 in sequential-quarter and as against Rs 21.28 in the corresponding quarter.

Revenue from operations was up by 12.1 per cent at Rs 5,291.2 crore in nine months period ended December 2021 as against Rs 4,718.8 crore in



the corresponding period last fiscal. Standalone net profit for the nine months period ended December 2021 at Rs 563.4 crore came down by 6.5 per cent as against a profit of Rs 602.7 crore in the corresponding period last fiscal.

At the consolidated level revenue from operations was up by 12 per cent at Rs 5,359.9 crore in nine months period ended December 2021 as against Rs 4,785.7 crore in nine months period ended December 2020. Consolidated net profit recorded at Rs 545.6 crore in nine months period ended December 2021 was down by 9 per cent as against a profit of Rs 606.2 crore in the corresponding period last fiscal.

Speaking on the results, **Nikhil Nanda, Chairman and Managing Director, Escorts,** said, "The tractor industry has now been impacted for two consecutive quarters due to high base of last year, the delayed harvest of Kharif crops owing to late monsoon rains this year which affected the rural cash flows and the retail demand. Going forward, we do expect cash flows to improve with better Kharif procurement and a positive outlook with good Rabi sowing. While high inflation remains a concern, we are hopeful of macro-economic factors to be in favour of agriculture to boost rural demand."

IN BRIEF

Govt to allow retro fitment of CNG kit to replace diesel engines in BS-VI vehicles

The Ministry of Road Transport & Highways has proposed to allow modification via retro fitment of CNG kit and replacement of diesel engines with CNG engines, in case of BS-VI vehicles, less than 3.5 tonne. The proposal came to vide draft notification dated January 27, 2022. As of now, retro fitment of CNG and LPG kits is permissible in motor vehicles under the BS-IV emission norms.

The notification lays down the type approval requirements for retro fitment. CNG is an environment-friendly fuel and will reduce the emission levels of Carbon monoxide, Hydrocarbon, particulate matter and smoke, as compared to petrol and diesel engines. The proposal has been formulated in consultation with stakeholders, the ministry said in a statement.

India is actively pushing for alternatives to replace fossil fuel vehicles in the country. After months of waiting, Delhi got its first of the 300 proposed electric buses with women and differently-abled-friendly features on January 17.

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Enhancing collaboration in construction machinery between Europe and India

CECE President Alexandre Marchetta and ICEMA President Dimitrov Krishnan have signed a Memorandum of Understanding extending the cooperation between the two continental organisations. The signature was announced at the end of the first of its kind CECE-ICEMA Summit held virtually.

The Memorandum of Understanding extends an initial partnership formalised in 2019 and sets the terms of understanding between CECE and ICEMA for their bilateral cooperation. The main objective of the cooperation is understanding reciprocal market developments and improving market access and global trade. CECE and ICEMA pledge to be working together towards closer collaboration in the area of regulatory convergence, data exchange and market openness.

"Both European and Indian markets offer great potential for the construction equipment industry" underlined CECE President Alexandre Marchetta. He reminded the importance of this partnership: "CECE ICEMA close collaboration helps the industry in improving market access and accelerating technical developments."

ICEMA President Dimitrov Krishnan said: "The ICEMA – CECE Summit 2022, first of its kind to be ever held between the Indian and EU Construction Equipment Industries, is a step in the right direction and opens up opportunities for constructive dialogue and collaboration between ICEMA and CECE across a wide range of areas spreading across technology development and sustainability, policy and trade, supply chain management, amongst others."

Vedanta to invest $15 bn in semiconductor, display unit ventures

The Vedanta Group, led by Anil Agarwal, is preparing for two individual ventures which may witness investments of around $15 billion in chip and display manufacturing space across the country.

One venture will be with the Hon Hai Technology Group, also known as Foxconn to manufacture 28-nanometer semiconductor chips, these will be based on a technology developed by Taiwanese multinationals. While the other is for a display manufacturing unit.

For the display unit venture, the company is having discussions with a minimum of seven global major companies which include Japan Display, LG, and Sharp for a potential partnership in technology or equity.

According to the managing director of Avanstrate (Vedanta Group firm), Akarsh Hebbar there are going to be two different special purpose vehicles (SPVs). There will be a 60:40 joint venture (JV) between Avanstrate and Foxconn for the chip (will bring in technology) manufacturing, wherein two equity partners are enough.

Currently, Avanstrate is searching for about 450 acres of land for both ventures. The locations are set in various parts of the country such as Maharashtra, Gujarat, Karnataka, and Tamil Nadu. The two companies formed a JV for the manufacturing of semiconductors on February 14.

Vishal Chaudhury appointed MD of CNH Industrial Capital in India

CNH Industrial Capital, the financial services division of CNH Industrial N.V., announces that Vishal Chaudhury has joined as Managing Director of CNH Industrial Capital (India) and will lead its Indian business unit. Chaudhury is a global executive with over 24 years of experience, with a demonstrated history of managing start-ups and revenue leadership positions. He held global sales finance positions with Nissan Motor Corporation, Japan, and was the COO of Nissan Financial Services in Australia. Prior to joining CNH Industrial Capital, he was the Business Head for Retail Assets from Liabilities Channel at IDFC First Bank.

IN BRIEF

NHAI to build 5,795 km NHs in aspirational districts

Over 100 Aspirational Districts would undergo the construction of 5,795 km of National Highways (NHs) under a Rs one trillion programme, which is about to be unveiled. The Road Ministry has selected 221 projects for expansion. The 5,566-km of roadways are already under construction in those districts, for Rs 66,000 crore. The previous reports highlighted that since the financial year (FY) 2014-15, the National Highways Authority of India's (NHAI) debt increased 14 times to over Rs three trillion from Rs 24,188 crore at the end of January 2022.

Particularly in FY22 and FY21, it borrowed nearly Rs 65,000 crore each. But reportedly, the Central Government now plans to reduce it by Rs one trillion by 2024-25. According to the data of the Ministry of Road Transport and Highways (MoRTH), all Aspirational Districts are already connected highways. The extension would enhance economic activity in these areas. In the last five years, more than 6,000 km NH has been constructed, which also connects ambitious districts. As per the ministry's annual report, in the first nine months of FY 2021-22, 5,835-km national highways have been built.

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Doosan Bobcat strengthens presence in South Rajasthan

Doosan Bobcat India has recently appointed Sihag Motors as its authorised channel partner to handle sales and services for the South Rajasthan region as part of the business expansion plans in India. With Head Office located at Bhilwara and an upcoming branch office at Udaipur, Sihag Motors would be focusing on the districts of Banswara, Chittorgarh, Pratapgarh, Baran, Dungarpur, Rajsamand, Jhalawar, Sirohi, Bundi, Kota, Bhilwara, and Udaipur.

The event was inaugurated by Rajesh Sihag, Managing Director of Sihag Motors. With over 21 years of industry experience, Rajesh is upbeat about the strategic presence of his dealership with respect to the territory assigned and is optimistic about serving the customers on the lookout for backhoe loaders, skid steer loaders, and mini excavators in the potential segments such as mining, cement, power, textile, PWD, plant hiring, sand loading, and municipal corporation. Chief Guest for the event Ankit Jaat, Director, RLR Construction, spoke about the South Rajasthan region as an important market for compact equipment primarily for material handling in various industry segments.

Santhosh Kumar, Shailendra Singh Rana, and Nikhil Raj of Doosan Bobcat India attended the event and addressed that they are very excited



about the channel partnership with Sihag Motors and their presence of strong manpower for sales and services that would enhance customer delight. The event was also attended by key customers and major financiers of the region who graced the launch event. The all-new Bobcat B900 CEV stage IV backhoe loaders were also displayed during the event.

Afcons creates milestones in J&K!

A major milestone was achieved on the Udhampur Srinagar Baramulla rail link project (USBRL) on February 15, 2022, with the breakthrough of tunnel T49 between Sumber and Arpinchala Stations on the ongoing Katra-Banihal section. T49 is a 12.75 km-long tunnel and is going to be the longest tunnel of the Indian Railways surpassing the Peer Panjal tunnel of 11.2 km on the Banihal-Qazigund section. The south portal of Tunnel T49 is located in the picturesque Sumber Village at an altitude of 1,400 m, while the north portal of the tunnel is located near Arpinchala Village at an altitude of 1,600 m.

Afcons, a key player in the strategic project, made it to the breakthrough point from the north portal despite numerous geological challenges. Describing the momentous occasion, Afcons' Project Manager Chandra Shekhar Dixit, said, "This is an incredible achievement for the Indian Railways, for the nation, and for Afcons. The project team has worked extremely hard for this day. Afcons has constructed 7.32 km of the 12.75 km-long tunnels amidst various geological and weather-related challenges."

While executing the tunnel from the north portal, Afcons' engineers excavated 4.07 km from a single adit. "This is the most critical and longest length executed by any agency from a single adit. No other agency in the entire USBRL project has excavated such a long distance from a single-phase," Dixit said.

Amidst the challenge of working in extremely cold conditions (as low as -10 degree centigrade) during the winter months, the team faced another major hurdle. There was water ingress of 40-50 litres per second which made tunneling extremely difficult. "Since we were working on a downward gradient, on average, we had to dewater almost two lakh KWH units per month. The water ingress was due to numerous aquifers and nullahs crossing the tunnel alignment," the Project Manager said. More than 60 per cent of the tunnel length was executed in very poor rock class. But extremely high deformation was observed in a 1.5 km stretch of the tunnel.

IN BRIEF

More greenfield highways to be built as part of NH development

The government's National Highway Development Program will now focus on building more greenfield highways rather than expanding the existing network, signalling a significant shift in focus.

According to the media, the next phase of Bharatmala-II, which will see nearly 8,500 km of national highways (NHs) built for Rs 3.5 lakh, will primarily focus on greenfield corridors. Pune-Bengaluru, Chennai-Trichy, Varanasi-Kolkata, Gorakhpur-Siliguri, and Hyderabad-Bengaluru are just a few of the stretches that have been identified.

The government is expected to launch a comprehensive programme for ropeway projects, which have enormous potential to improve connectivity in the hill states. Nearly 50 proposals for ropeway projects have been submitted by Uttarakhand, Jammu and Kashmir, Himachal Pradesh, and Manipur. In the case of Bharatmala-II, the National Highways Authority of India (NHAI) has been preparing detailed project reports (DPRs) for these stretches to begin inviting bids as soon as the scheme is approved by the Union cabinet.

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MoRTH lays foundation stone of NH projects worth Rs 3,972 cr

The Minister of Road Transport and Highways (MoRTH), Nitin Gadkari, laid the foundation stone for National Highway (NH) Projects worth Rs 3,972 crore in Belgavi. These five projects of 238 km include Belagavi-Sankeshwar bypass, Sankeshwar bypass, Chorla-Jamboki-Belagavi, Vijayapura-Muragundi (NH-548B) and Siddapura-Vijayapura (NH-561A).

CM of Karnataka, Basavaraj Bommai and Minister of Parliamentary Affairs, Coal and Mines of India, Pralhad Joshi, also attended the event. Gadkari said these NH projects would spur economic growth and interstate economic activities. The highway corridor project will be constructed in many places across the country, promoting economic growth and reducing fuel costs.

He added that it would promote green vehicles to reduce pollution. Many regions of Karnataka would also be included under the Bharat Mala-2 project. The project between Bengaluru and Chennai will help cover the distance in just two hours. Another project connecting Surat to Chennai is issued setting up a logistic park.

IT hub between Bengaluru and Tamil Nadu can be established along the highways to provide employment and increase the economy. The Minister will work in reducing the travel length between Pune to Bengaluru by 100 km. Water conservation along the NH under the Jalshankti programme is also part of the project.

Bommai said that the development works are being



undertaken by the central and the state government would lay a strong foundation for progress in the economic, social, and education sectors in Karnataka. He added that the transportation system would be changed in Karnataka after completing the NH projects.

Many development projects in the state have been implemented owing to the commitment and diligence of Minister Prahlad Joshi.

NHAI to construct 14.80 km six-lane bypass ahead of Bhandara city

The National Highways Authority of India (NHAI) would construct a 14.80 km six-lane bypass ahead of Bhandara city for smooth flow of traffic between Nagpur-Bhandara-Raipur. The overall cost of the project is Rs 700 crore.

The six-lane bypass would ease the traffic between Nagpur-Bhandara-Raipur. It also includes a bridge over the Wainganga River. Rajeev Agrawal, NHAI chief general manager (CGM) and regional officer, told the media that the Bhandara bypass would be between 485-499.80 km on NH-53 (old NH6), which would be built in engineering, procurement, and construction (EPC) mode.

Agarwal informed that the Pune-based Shri Swami Samarth Engineers Limited secured the contract via a tendering process. The whole land acquisition procedure is already finished, and the work is likely to begin next month.

The six-lane divided bypass would be a boon for travellers who presently use the current bridge to enter and



exit Bhandara city. The NHAI CGM said that the Bhandara bypass is necessary for better connectivity and smooth vehicle movement among the Nagpur-Raipur section.

On the Wainganga River, the 600 m six-lane bridge would also reduce traffic congestion. The regional officer revealed that the 10.34 km greenfield length of the bypass is entirely accessed-control by providing service road and other road safety by giving two flyovers and 17 underpasses.

Currently, NHAI has reached Stage-I forest clearance under the Forest (Conservation) Act, 1980, and tree felling is also finished.

IN BRIEF

443 infra projects hits cost overruns of Rs 4.45 lakh crore: Report

A government report revealed that 443 infrastructure projects, with the cost of investment of over Rs 150 crore, have been hit by cost overruns totalling over Rs 4.45 lakh crore. The Ministry of Statistics and Programme Implementation (MOSPI) monitors infrastructure projects of Rs 150 crore and above.

As per the report, till January 2022, expenditure incurred on these projects stood at Rs 13,16,293.63 crore or 48.76 per cent of the estimated project cost. From 1,671 such projects, 514 projects were delayed, and 443 reported cost overruns.

However, the number of delayed projects reduces to 381, based on the latest completion schedule. Moreover, for 881 projects, neither the year of commissioning nor the tentative gestation period has been declared.

Out of the 514 delayed projects, 89 have a total delay of one to two months, 113 are delayed for 13-24 months, 204 for 25-60 months, and 108 projects have been delayed for over 61 months. Overall estimated time overrun in these 514 delayed projects is 46.23 months.

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Doosan launches three Dash-7 wheel loaders for US

Doosan Group has launched the latest new models in bucket sizes from 2.6 cubic yards on the DL200-7 to 3.3 cubic yards on the DL250-7. Doosan product marketing manager, Aaron Kleingartner, told the media that the company had upgraded the performance on the dash-7s from the dash-5 loaders, with larger bucket capacities, more durability, stronger axles, and more powerful powertrains.

The cabs are roomier and more comfortable, which include a new Doosan Smart Touch 8-inch touchscreen monitor and Doosan Smart Key to allow the loader to start without a key in the ignition. It can operate on transparent bucket technology where the operator can see on a monitor what is on the other side of the bucket.

The loaders include a Z-bar link. The parallel linkage of the two tool carrier models will be designed for lifting and placing objects, with fork-type attachments, instead of digging and moving material. The standard Z-bar models can be equipped with Doosan buckets like general-purpose, heavy-duty, light-duty, and rock buckets.

The windows and door now come down to the floor for improved visibility. The heating, ventilation and air conditioning (HVAC) unit has been moved from the rear side where it was taking up cab space, now will create more room in the cab.

Other features are a rear-view camera and a more ergonomic arrangement of switches and controls. Doosan product specialist, Bill Zak, said that the product is designed to be easier to operate, even for a less experienced individual.

The loaders are equipped with Doosan Smart Guidance to match engine output to conserve fuel. While the machine is operating, pop-ups will appear on the touchscreen, like hitting the brakes too hard based on the conditions. It will give the operator an efficiency score and show what could be improved.

Volvo CE and Norrhydro develop electro-hydraulic solution

Volvo Construction Equipment and Finland's Norrhydro have developed a digital hydraulic actuator that increases productivity while cutting fuel bills and CO_2 emissions in construction applications. If widely adopted, it could help the industry meet its sustainability ambitions while at the same time improving machine performance.

The Norrhydro patented system, NorrDigi, uses a multi-chamber digital hydraulic actuator that improves system efficiency that much of a machine's hydraulic system can be discarded or downsized. It removes the need for the main control valve – the heart of a traditional hydraulic system – along with excessive pump capacity, piping, and hoses. It uses less energy and offers the prospect of downsizing the engine capacity.

The ongoing validations of the solution have demonstrated both efficiency improvement and increased machine productivity. With carbon dioxide emissions reduced, it is making a radical cut in the machine's carbon footprint. Volvo CE and Norrhydro have signed a multi-year agreement where Volvo CE will continue to develop the technology in partnership with Norrhydro, and subsequently, aim for first-mover advantage. Volvo CE has exclusive rights to its use in its products during the development process.

Unlike traditional cylinders with two chambers – one pushing, one pulling – the digital hydraulic actuator uses four chambers that can be connected in up to 16 different



permutations, depending on the load required by the desired operation. "It's a bit like a 16-speed linear transmission," says Peter Stambro, Vice President Business Development at Norrhydro. "Multi-chamber cylinders have been around for a while, but what makes our ones exceptional is the way they have been combined with advanced electronic control systems, whose complex algorithms and computational speed allow for instant response."

IN BRIEF

Manitou adds new compact telescopic loader to NA line

Manitou Group has introduced the new Manitou MLT 420 AG telescopic loader to its MLT product line-up for North America. The MLT 420 is the most compact Manitou telescopic loader in the product line, can navigate in confined spaces, and offers all the advantages of a loader, telehandler, and industrial forklift combined.

The compact dimensions -just 58-inch wide and 79-inch high- makes it easy to work in confined spaces, while also having a maximum lift capacity of 4,400 lbs. and a maximum lift height of 14 feet 4 inches.

Although compact, the Manitou MLT 420 has a full-size operator's cab for ultimate comfort and full 360-degree visibility. The machine is easy to operate, and a two-speed hydrostatic transmission with directional and gear change on the JSM (Joystick, Switch and Move) adds flexibility and precision. The JSM joysticks allow the operator to control all hydraulic functions with one hand, so the other hand can remain on the steering wheel at all times for added safety. The MLT 420 is also equipped with a standard auto-reversing fan.

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SBM releases powerful mobile jaw crusher for stone and recycling applications

SBM Mineral Processing has released the JAWMAX 200, a compact and powerful entry model mobile jaw crusher that is ideal for not only the processing of natural rocks and stones but also for recycling purposes.

The mobile plant features a large feed opening of 1,000 mm x 600 mm and can also be used as a primary crusher for impact mills at small sites. The automatic soft start ensures easy operation of the plant which makes it ideal for machine rental, as it is very easy to start or stop the plant by remote control from an excavator or wheel loader. The JAWMAX 200 features fully automated gap adjustment, overload protection, radio remote control, magnetic separator, and lowerable discharge conveyor. JAWMAX 200 has a transport weight of 27 tons, meaning that this crusher is a lightweight plant in the compact class. The plant is also fully electric.

With the product introduction of JAWMAX 200, SBM is repositioning its sales strategy in the field of mobile processing plants. Over the last few years, the SBM team has made structural changes and has re-orientated the sales department. It aims to exclusively distribute mobile crushing and screening solutions via a network of distribution partners by the end of 2021.



This re-orientation aims to ensure the economic success of SBM's clients in applications such as quarrying and processing natural stones, gravel, sand, and ballast; construction and road construction; recycling of concrete, asphalt, and construction waste; the mining industry; and the recycling of industrial waste products.

XCMG's integrated solutions at bauma China

Leading construction machinery manufacturer XCMG presented its best products and brightest technologies in a super exhibition at the 2020 bauma China. The company hosted more than 100 events online and offline and continuously live-streamed through 72 hours to highlight XCMG's latest achievements in unmanned driving, high-end parts, environmental conservation, and clean energy. XCMG released China's first super-tonnage electric wheel loader XC9350 at the international trade fair, an unprecedented innovation that made XCMG the only Chinese manufacturer and third in the world with the capability to produce 35-ton super-large loaders.

XCMG's exhibition also introduced the company's most powerful products to global audiences, including the world's most powerful all-terrain crane XCA1600, the industry's largest electric excavator XE270E, the world's first 90-ton triaxial mining dump truck XDM100, China's largest horsepower mining grade GR5505 and more.

"Quality and innovation are two keywords in integrated development strategy, we are always aiming to become a leader in the industry, creating cutting-edge products for our customers and offering top-notch services. We are glad to show the best at bauma China 2020.," said Wang Min, Chairman of XCMG.

Genie unveils E-Drive for GS slab scissor lifts

Genie has released the new E-Drive system, an optimized AC Electric drive system available across its entire line of GS slab scissor lifts. Ideal for commercial and residential contractors, rental owners, and retail users seeking to reduce the total cost of ownership, the new E-Drive equipped GS scissor lifts to deliver increased run time and reduced maintenance costs. The new E-Drive motors are brushless and fully sealed against moisture and water for maintenance-free longevity. Further reducing service downtime, the new GS E-drive scissor lifts have 70 per cent fewer hydraulic hoses and fittings, drastically reducing the potential for hydraulic leaks.

IN BRIEF

Deere adds P-tier versions to excavators

Models 350 and 380 John Deere excavators are now available in the company's P-tier versions. These are the first excavators to be launched under the company's Performance Tiering strategy.

The Deere 350 P-tier and Deere 380 P-tier excavators are designed to deliver "exceptional performance, efficiency, comfort, and service life in demanding, high-production applications," according to the company. The Deere 350 is a 40-ton machine; the 380 operates at 85,462 pounds.

Both excavators have SmartGrade technology as a factory option and field upgrade kits. Customers can choose from 2D guidance, 3D guidance, 2D SmartGrade Ready Control, and SmartGrade 3D Control, and can upgrade as necessary. Overdig protects limits the bucket's cutting edge from going below the target design surface.

Visibility around the machines has been improved with the option of a right, rear, and left camera system with LED surround lighting that provides enhanced 270-degree visibility and is integrated into the primary display in the cab.

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WHAT'S YOUR C-SAT SCORE?

C-SAT is a commonly used metric that acts as a key performance indicator for customer service and product quality in all kinds of businesses. C-SAT is short for customer satisfaction score.



The growth of the Indian construction equipment industry has been on an upswing. This has been greatly propelled by the Government's focus on infrastructure development. India is thus at the threshold of becoming one of the foremost developing countries in which infrastructure is growing at a fast pace, with almost 27 km of highways being developed on a daily basis across the country. Given this great opportunity, deploying smart and sustainable construction equipment will increase demand for such machinery apart from assuring resources for the future. Many companies are nowadays seeking LEED certification for their offices and implementing recycling programmes, both in-house and at construction sites.

Environmental sustainability and the energy-intensive construction industry don't often go hand-in-hand. The construction industry is a massive consumer of raw materials and natural resources, and it generates an estimated 39 per cent of the world's carbon emissions. However, there is some good news. The sector is gradually becoming more sustainable despite many conflicting goals and complex challenges. With global warming emerging as the new buzzword and climate change problems causing growing

concern among people worldwide, many industries are bolstering their efforts to become environmentally conscious; the construction equipment industry [too] isn't far behind in this journey. The construction equipment Industry is hence bracing itself to adopt and reap the full benefits of sustainable technologies to boost its competitive advantage and improve its bottom line.

Also, the pace at which construction automation is advancing is staggering. We can already find drones hovering above building sites and three-dimensional printed buildings being assembled. One of the best parts about the advancements of robotics in this industry is that it is becoming easier and more enjoyable to use. The way humans interact with robots is key to implementing a successful solution on any site. Robots and the technology behind them are becoming a valuable extension of construction teams by tackling some of the toughest challenges faced by the industry.

The demands placed on construction equipment have evolved dramatically over the years. With the new updates and functions being added all the time and requirements for operational efficiency and quality higher than ever, these equipment need an automation system that is both powerful and scalable.

Customer service is on the decline—not specifically in the construction industry, but across the board. There is a belief that customer-centric construction costs too much and, in a hard-bid environment, it is less important than efficiency or safety. Customer-focused activities differ from marketing, in that the focus is on driving more intimate relations through project delivery and the interactions of the team with the customer.

So, what is the industry's C-SAT score? Construction equipment players provide the answers.

Customer-centric construction

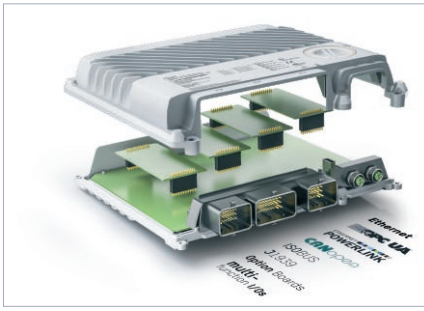
The construction industry is going through a transforming phase. Unlike the previous years, a lot has changed in terms of consumer behavior. It has become imperative for organisations now to explore even further unconventional ways to impact both cognitive and peripheral routes of customer decision-making for driving their buying behaviors. The customers need to be touched on the economical fronts for the driving route of cognitive persuasive behavior, and also the emotional and self-esteem is equally imperative to be harnessed to drive their peripheral route of persuasion.


Arvind K Garg

Says **Arvind K Garg, Executive Vice President and Head, L&T Construction & Mining Machinery,** "At L&T, customer centricity has been at the core of all activities and decisions. With our credo 'In Service lies Success', we have continuously provided superior value delivery to customers both in terms of the latest technology and superior performance products aided by unmatched after-sales support. We have been evolving our customer service delivery to be ahead of the curve and have now embraced technology in a big way."

Some of L&T's recent initiatives include L&T's pro-active after-sales support programme, which seamlessly integrates smart machines with customer requirements and an effective team to provide unmatched after-sales support and exceptional experience to construction equipment customers. The company also offers a unique machine care programme Suraksha-10000 / MCP-4, which is an industry-leading initiative from L&T and Komatsu. Under this programme, Komatsu's PC210/PC210LC-10M0, PC300 / PC350LC-8M0 machines come with an extended power train warranty for a period of four years/10,000 hours and bundled with a host of value-added services such as scheduled services, energy-saving training and guidance, PM clinics, undercarriage inspection, and machine health reports. This programme is aimed at assuring customers true peace of mind.

Manish Mathur, CEO – Cranes, Action Construction Equipment, thinks that value for


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money would define the word "cost-effective" for them. He added, "We have always ensured to provide our customers with value for money products so that they can increase their productivity and profits by using ACE machines. All of our products are designed in-house keeping Indian operational and market conditions in mind. The very USP of our product comes from the fact that with the appropriate design we can control the costs to cater to benefit our customers."


Manish Mathur

Like ACE & L&T, Tata Hitachi Construction Machinery [too] puts emphasis on customers.


Anand Hariharan

Said **Anand Hariharan, Head – Product Development, Tata Hitachi Construction Machinery,** "We have laid special emphasis on customer-friendly products and solutions that are easy to adapt to and help in enhancing usability and serviceability. We ensure greater proximity to customers through over 250 touchpoints covered by our 47 domestic and four international dealers. We also continue to invest in aftersales support through our dealers in terms of diagnostic vehicles, mobile workshops, and increasing numbers of outlets, so that we are within reach of the customer in the shortest time possible."

Tata Hitachi Construction Machinery has continued to enhance its presence in digital communications channels, where they are seeing great traction in terms of audience participation as well as engagement. Also, the company has conducted several product launches on social media channels, which have proven to be valuable as well as cost-effective. The company's digital connect platform, e-Dost, which provides a seamless digital experience, has augmented capability to engage with customers. This platform enables customers to transact with them on sales as well as aftersales requirements virtually.

"Beginning with understanding the requirement, conceptualising the product, prototyping, testing, and industrialising, a customer-centric approach remains the cornerstone that defines these processes. These customer-centric processes have helped us to work closely with large OEMs who are leaders in their field and develop tailor-made solutions for their varied requirements. Over the years this has resulted in the development of a range of products, that are unmatched in the industry, helping us serve a diverse set of markets," discusses **Kennady V Kaippally, Country Manager, Bonfiglioli India.**

AJAX has a wide network of dealers for product sales and after-sales support across the country as well as in markets outside India. Currently, 35+ dealers in India with 100+ touchpoints are available to cater sales and services for the customer. AJAX is also serving the international market through 16+ international distributors and has its presence in Asia-Pacific, the Middle East, and North Africa (MENA) regions.

"The full-fledged team of skilled engineers of AJAX is trained to handle both preventive and general maintenance of the machine. AJAX with its wide network of dealer service centres across the country offers maintenance, repair, and overhaul (MRO) equipment to ensure the best value for money to customers. AJAX customer care can be reached 24X7 for any queries and requests, thereby enabling round-the-clock support. AJAX offers excellent serviceability options to ensure maximum uptime of the machines thereby enhancing customer satisfaction to a greater level," said **Debasis Bhattacharya, Head Sales and Marketing, AJAX Engineering.**


Debasis Bhattacharya

Sustainability at the forefront

Sustainable design will be critical as construction equipment companies seek to reduce their energy consumption. The industry recognises the need to address these urgent and often competing issues, especially within their supply chains.


Hafeez Khan

Said **Hafeez Khan, Managing Director, Manitou South Asia,** "The construction industry is getting more efficient day by day with new technology. With efficiency needs, users are demanding features like compactness, environment-friendly, etc. Manitou, with its 60+ years of experience, is constantly investing in new products with new technologies and features that are fully aligned to the customer's demand and their various applications."

He added, "Our Indian products are now equipped with BSIV engines, which are more fuel-efficient. Manitou has also launched its 100 per cent electric range. The oxygen line includes a new aerial platform and a pair of telehandler models. We have launched our first electric all-terrain aerial platform with a working height of up to 20 m, which works at par with current diesel-powered platforms. Equipped with 48V



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battery, it can achieve up to one working day on a full charge in adverse weather conditions. The ATJ 200e Oxygen is the group's first electric all-terrain aerial platform. With a working height of up to 20 m for a maximum capacity of 230 kg, the model provides the same performance as a diesel-powered version."

"As our environment is increasingly being threatened by the amount of pollution, Doosan Bobcat India turns its complete focus towards green initiatives by adapting to newer technologies and making eco-friendly equipment for a pollution-free environment. Bobcat B900 CEV Stage IV backhoe loader powered by H4 series electronic engine from Ashok Leyland is amongst the most reliable and proven engines working in the construction equipment segment. The engine produces more horsepower which emits a far lesser amount of smoke and offers great fuel efficiency. Usage of such fuel-efficient equipment is not only beneficial for the eco-system but for customers in reducing the overall maintenance cost. In addition, it helps in extending runtime, ensuring greater productivity and lesser time in refueling, and acquiring fuel, thereby, reducing total operating costs," avers **Hyunsoo Kim, MD and CEO, Doosan Bobcat India.**


Hyunsoo Kim


Saurabh Kulkarni

Saurabh Kulkarni, Mobile Automation Expert, B&R Industrial Automation, avers, "Green initiatives are beneficial for our ecosystem, and they are also helping equipment manufacturers as they can decrease the overall cost of equipment maintenance. Realising this trend, equipment manufacturers are now developing equipment that consumes less energy and provides fuel efficiency. We already have energy and condition monitoring solutions in our portfolio to understand the need to save the environment."

With integrated safety technology and its economic and easy-to-implement condition and energy monitoring solutions, B&R is setting trends that bring sustained benefits for our equipment manufacturers. Our modular controls and I/O system are equipped with condition monitoring functions, which help detect problems like increased vibration levels or jammed components in their early stages and correct them before they result in unplanned downtime. This results in significantly superior equipment with less maintenance requirement and sustaining extended service intervals, saving a lot of resources.

In line with the green initiatives, Sany India has launched new truck cranes and motor graders adhering to the Bharat CEV Stage IV norms in the Indian market.


Dheeraj Panda

Dheeraj Panda, Chief Operating Officer (Sales, Marketing and Customer Support), Sany Heavy Industry India, said "In addition, our new machines are equipped with the multimode power output function, which consumes less power. We are also exploring/launching blended fuels like biodiesel-compliant engines. As electrification in heavy machines is gaining momentum, we are considering this electric solution under green initiatives."

He added, "With the increasing climate change problem, our customers and construction equipment industries have become more environmentally conscious. The equipment manufacturers are now focussing on developing machines that would emit a lesser amount of smoke and give better fuel efficiency."

On green initiatives by the company, **VG Sakthikumar, Managing Director, Schwing Stetter India,** said "Whatever machines we make, our conception is the lowest. We are planning to move to electric with certain products that are dealing with exhaust fumes. Probably, the first will be construction machinery. Talking about the load capacity of these available machines in tunneling projects, the maximum a machine can do is 30 km. The machines go inside, deliver concrete and come out. Secondly, the fumes inside the tunnel can be really harmful to the people and very low-temperature causes problem to start the diesel engines. So, we are targeting to solve multiple problems through electric vehicles."


VG Sakthikumar

Caring for the environment and playing an active, responsible role in society have always been important to Volvo CE. "The industry is moving towards cleaner engines and has moved from BSIII to BSIV engines. Almost 60 per cent of what we sell is going into next-generation emissions, which will help out pollution levels caused by the machines to much lower levels. This is a huge change in technology. Obviously, it costs more on the product side, but it is also a product that will consume lesser fuel as compared to the previous generation, and will

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give far better quality," added **Dimitrov Krishnan, Managing Director, Volvo CE India.**


Dimitrov Krishnan

Said Garg of L&T, "Komatsu's current engines are capable of using B20 biodiesel. We are exploring the possibilities of conducting trials at a few sites. However, supply chain, quality, and standardisation challenges related to bio-fuel needs to be addressed before we could scale it up. Similarly, road machinery manufactured by L&T is now upgraded to meet CEV-IV emission norms which were brought in by the Government of India effective October 1, 2021. L&T has developed strong capabilities to design and develop world-class products to meet the 'Make in India' initiative and fulfill the mission of 'Atmanirbhar Bharat'."

Manitou has also launched its 100 per cent electric range. The oxygen line includes a new aerial platform and a pair of telehandler models. "We have launched our first electric all terrain aerial platform with working height of up to 20 m, which works at par with current diesel powered platforms. Equipped with 48V battery, it can achieve up to one working day on a full charge in adverse weather conditions, avered Manitou South Asia's Managing Director.

Said Bhattacharya of AJAX, "Over the last three decades, the need for energy efficiency, higher productivity, easy mobility, and flexibility has been our focus to meet growing customer needs. We at AJAX working on CAT engine with biodiesel. we are offering our customers the latest technology products with BSIV engines. Our ARGO 4800 has an electronic drum control unit that ensures the change in engine RPM does not affect the drum rotation for the smooth operation of concrete mixing. This feature helps in homogeneous concrete mix and effective cleaning of the drum."



Creating a customer-centric business model is key to success in today's marketplace.

Automation: Need of the hour

Business owners can reduce costs and improve safety while the project team benefits from increased productivity by allowing robotics to take over high-risk tasks. Construction automation technology can also ensure projects are completed in a timely manner, as production is kept moving despite uncontrollable factors that might hinder completion time under other operating conditions.

Automation also enhances worker safety at construction sites. Worker safety has long been a concern in the construction industry, with the presence of environmental hazards and heavy construction equipment.

Krishnan pointed out three megatrends that will change the face of the automobile and construction equipment business. These include electromobility, connectivity, and automation. "Electromobility is yet to see traction in the automobile industry. Although in the western market, electromobility in the smaller equipment has already started. Volvo is one of the companies that has launched small excavators, loaders, etc., which are 100 per cent electric. However, this is yet to happen in India. Even in the European and American markets, electromobility is still in the early stages," said Krishnan.

He added, "Semi automation has started to get good traction in the western world, particularly in the machine control systems. So, even if you have workers with less skill, you can still achieve maximum results through this system. Full automation is happening only in specific sectors, and is not yet happening in full steam."

"While at the core our machines are hydrau-mechanical systems, digitalisation is used for enabling machine health and performance monitoring and reporting. Komatsu's next-gen Komtrax systems on their range of hydraulic Excavators have enabled the customers to look at the way the machine is operated, working load condition, machine utilisation including various modes and selection by the operator. This system also comes with a host of tools to guide the operator on optimum utilisation, machine health, and safety. L&T's range of road machinery is equipped with 'DigiEye' vehicle health monitoring system," said Garg of L&T.

Said Bhattacharya of AJAX, "Our endeavour is to provide the best concreting business solutions, which are driven by innovation in technology. We have embraced digital transformation to offer innovative products and services basis our

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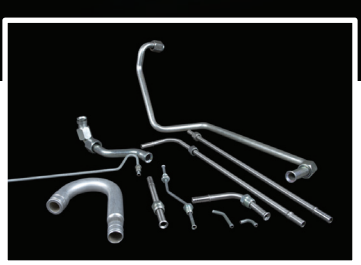




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engineering knowledge about the concreting segment. We have diversified the application of Artificial Intelligence, Machine Learning, and the Internet of Things in our operations to provide 360-degree solutions which are at par with the global standard."

The company's SLCM is equipped with the latest Telematics solutions – "AJAX Smart Fleet".

Said Kaipally of Bonfiglioli India, "Equipment monitoring and human-machine interface are becoming important for matching the ever-growing performance expectations of customers. We have many solutions where electronic and hydraulic features are integrated into mechanical transmissions systems to provide an online feedback mechanism to equipment operators. One such solution is the integration of the load cell with the gearbox. This quickly and precisely measures torque and enables torque monitoring in real-time. Connected via an external cable connection, the system provides an automatic engine shutdown to protect the drive or reduce the capacity of the frequency converter, while providing information to the PLC. In addition, the system also has an anti-seize function that prevents blockages. The evaluation of its data also facilitates predictive maintenance."

B&R offers innovative software solutions, mapp technology components, and mappView widgets that help create powerful, intuitive, web-enabled HMI screens. These widgets in mappView are built on HTML5 are conveniently dragged and dropped into place on the desired page to create interactive screens.

"The machines provide an enormous amount of important data; this can be process data or data related to equipment health. However, collecting data is not just enough. Showing it in a form that an operator can visualise and makes necessary decisions by looking at the charts and graphs derived from collected data will make the difference. B&R is aware of this need, and our product family of power panels and T- panels very well suffice to the need for a human-machine interface," added Kulkarni of B&R.

Leaders in their arena, ACE has always pro-actively fulfilled each one of its customers' needs, requirements, and indeed wishes. Technology is now at center-stage and its use will not only be providing economically viable solutions for the manufacturers, operators, and customers but also environmentally viable solutions in the future. "At ACE, we are already utilising some of the best technology available worldwide, and we constantly work to upgrade and adapt all possible technology to Indian working conditions," said Mathur of ACE.

Panda of Sany Heavy Industry India thinks that both the evolving new technologies like



Sustainability will be critical as CE companies seek to reduce their energy consumption.

equipment monitoring and Human Machine Interface (HMI) will change between the man and machine interactions. "Looking into the technological advancements, we have already taken up a step with Sany's Telematics system, which helps monitor the key operational parameters and provide timely intimation to the users. In addition, Sany India also offers an EVI app that helps customers and OEMs monitor every machine's operation and act swiftly to any issues, thereby enhancing agility. While, to further redefine the customers' experience, we are also planning to introduce HIM trends."

Conclusion

It's the era of smart manufacturing. Innovative technologies like Artificial Intelligence, Cloud Monitoring and the Industrial Internet of Things (IIoT) are transforming processes and machinery to set new efficiency standards. But can automation usher the transition towards a sustainable future for industries?

Even as the construction equipment industry is adopting the changed environment post the Covid-19 pandemic, there are emerging opportunities for industrial operators to lead the way to a lower-carbon future. From introducing hybrid-electric equipment and fully electrifying operations to boosting efficiency through digitisation, advanced analytics, and Artificial Intelligence.

Innovation aimed at satisfying the demand for lower-carbon technologies and more sustainable products as well as rebuilding supply chains toward more circular practices has become crucial. Shifting to full electrification from fossil fuels is one of the major initiatives to meet financial and environmental goals. By leveraging digital technologies, industrial operators can optimise processes and increase energy efficiency to chart their own sustainability journey.

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"At L&T, customer centricity has been at the core of all activities."

- **Arvind K Garg,** Executive Vice-President and Head, L&T Construction & Mining Machinery



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

At L&T, customer centricity has been at the core of all activities and decisions. With our credo 'In Service lies Success', we have continuously provided superior value delivery to customers both in terms of the latest technology and superior performance products aided by unmatched after-sales support.

We have been evolving our customer service delivery to be ahead of the curve and have now embraced technology in a big way. Some of our recent initiatives include:

Suraksha-10000 / MCP-4 Machine Care programme is a unique, industry-leading initiative from L&T and Komatsu. Under this program, Komatsu's PC210/PC210LC-10M0, PC300 / PC350LC-8M0 machines come with an extended power train warranty for a period of four yours/10,000 hours and bundled with a host of value-added services such as scheduled services, energy-saving, training and guidance, preventive maintenance clinics, undercarriage inspection, and machine health reports. This programme is aimed at assuring customers true peace of mind.

Equip-Care: L&T's pro-active after-sales support programme, seamlessly integrates smart machines with customer requirements and an effective team to provide unmatched after-sales support and exceptional experience to construction equipment customers.

Maintenance contracts: L&T provides full/ annual maintenance contracts to fleet owners and large companies at their project sites spread across India to ensure high machine uptime and high equipment utilisation, made possible by its dedicated and skilled workmen. Under this programme, Komatsu machines have excelled to set new records. For instance, Komatsu HD785 Rear Dumpers deployed at Iron ore mines in Eastern India crossed 60,000 hours setting new benchmarks in performance.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs, and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

Komatsu's NextGen, Dash 10M0 "truly efficient" hydraulic excavators, developed especially for Indian customers, have pushed the efficiency to the next level. These machines with technologies like viscous-fan clutch and the like have enabled the customers to get all the power developed by the engine at the Hydraulic Pump with very low energy loss on account of peripherals on the engine (Gross hp ~ Net hp).

Improved Hydraulics and load sensing variable horsepower configuration have enabled these machines to provide unmatched fuel efficiency while ensuring the highest productivity, to our customers.

PC210/PC210LC-10M0 machines crossing the 2000-machine mark in less than 18 active sales months, since the start of sales in January 2020, is a true testimony to customers patronising advanced technology and the "Truly Efficient" product that has created history in the 22-tonne market with its credibility and reliability.

Komatsu's current engines, fitted on construction and mining equipment, are capable of operating with B20 bio-diesel. We will be shortly conducting trials at a few sites. However, supply chain, quality, and standardisation challenges related to bio-fuel needs to be addressed before we could scale it up.

Similarly, road machinery manufactured by L&T is now upgraded to meet CEV-IV emission norms which were introduced by MoRTH effective October 1, 2021. L&T has developed strong capabilities to design and develop world-class products to meet the 'Make in India' initiative and fulfill the mission of 'Atmanirbhar Bharat'.



The hydraulic excavator comes with a host of tools.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

While at the core our machines are hydrau-mechanical systems, digitalisation is used for enabling machine health and performance monitoring and reporting. Komatsu's next-gen Komtrax systems on their range of Hydraulic Excavators have enabled visibility to the customers on aspects of the machine's operation, working load condition, machine utilisation including various modes and selection by the operator. This system also comes with a host of tools to guide the operator on optimum utilisation, machine health, and safety. Komatsu Mining Equipment is fitted with an advanced level of Komtrax and data transfer protocols for integrators to provide fleet management systems. L&T's range of road machinery is equipped with 'DigiEye' vehicle health monitoring system.

What efforts are being made to make your product more versatile for customers?

As mentioned, we have always focussed on superior value proposition/solutions for our customers through our products and services. Besides introducing Hydraulic Excavators, L&T was also the earliest to build versatility into the products.

Today, we have tied up with global manufacturers to offer a wide range of attachments such as Rock Breakers and Quick Couplers from Komatsu; Boom Breakers, cutters, and scrap handling attachment from Rammer; Drilling and Cutting solution from Kemrock; Pile driving and soil stabilisation attachments from Movax. L&T has also developed special attachments indigenously viz., Crusher Bucket, Slope Compactor, Clamshell Bucket, Wood Grapple, Rock Splitter, and Rock Grappler, that could be fitted on a range of Hydraulic Excavators. The need for special attachments is growing and these are expected to play a strong role in the urban development and modernisation of cities and we look forward to expanding the market with these new products.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we had to move to complete electric offering for the customers?

When the world was talking of carbon fuel, L&T pioneered the development of electrically-driven Excavators during the 1980s. L&T engineers designed and developed electrically-driven excavator models 90CKE and 300CKE and introduced these two futuristic products back then. These were successfully developed with electric drive, in place of a diesel engine, and accepted by users. These machines drew power through a power cable plugged into an HT field switch. We have supplied more than 200 L&T 300 CK(Electric) for mining applications over the past three decades.

In a related perspective, L&T recently supplied, erected, and commissioned Komatsu's large-size electrically operated shovel, PC3000, to a large coal company despite the Covid limitations. The mining industry is looking at increasing the share of electrically-driven shovels and excavators.

With battery technology development happening at a brisk pace, Komatsu has already developed and is selling their compact range of equipment powered by batteries. These are yet to be introduced in India. However, with the Government of India's commitment to making our country 'carbon neutral' by 2070, we will soon see the advent of electrically-powered smaller equipment, especially for use in the urban areas once the charging infrastructure is in place.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

India is poised to become the second-largest market for construction and mining machinery by the year 2030. L&T, along with Komatsu, will continue to invest in superior technology and products that shall deliver higher value and fleet solutions to our customers. We have been partnering with the nation for the last 75 years with a valuable contribution to the core sectors and will continue to be committed to achieving higher levels of growth.

Our current offerings encompass Hydraulic Excavators, Dozers, Motor Graders, Wheel Loaders, Dump Trucks, Tipper Trucks, and Vibratory Compactors. We will roll out new variants that will enable accelerate the infrastructure development in the country across roads, ports, airports, railways, realty, and other key segments of growth that have a considerable impact on the economy.

"We plan to move to electric."

- VG Sakthikumar, Managing Director, Schwing Stetter India



Despite the pandemic, the year 2021 was the best year for Schwing Stetter in terms of business. So, what special did you offer?

Customer satisfaction is important in any business. We were in constant touch with our customers by keeping their focus on our business by contacting them and offering solutions. For example, when the BSIII to BSIV migration happened, the government said that we cannot use BSIII engines. We reworked the product, increased the capacity, and gave the money advantage to our customers. We did not add that cost to our engine. In fact, we made many changes to our machine. We made our machines faster, climb higher gradients, and carry more capacity. For these reasons, our market share jumped. This was from the factory side.

We increased our non-concreting dealership as we have only four to five product types. During Excon 2019, we appointed five dealers. But now, we have 28 dealers selling the excavators within India. Each state has one dealer. We did a lot of work and due diligence to bring them in – inducting them, training them, and setting up offices. We have done all these things in the last couple of years.

In 2020, we sold about 200 excavators, and in 2021, it jumped to 650 – practically bringing our market share from the last quarter to close to 5 per cent. This is a big achievement because the excavator's business [worldwide] is going down. Most of the companies are still stuck with 2018, 2019 selling numbers, but we have moved up! This year, we plan to cross more than 1,000 units.

Nowadays customers are focusing on green initiatives by reducing fuel efficiency. What is Schwing Stetter doing to match these requirements?

Whatever machines we make, our conception is the lowest. We are planning to move to electric with certain products that are dealing with exhaust fumes. Probably, the first will be construction machinery.

Talking about the load capacity of these available machines in tunneling projects, the maximum a machine can do is 30 km. The machines go inside, deliver concrete and come out. Secondly, the fumes inside the tunnel can be really harmful to the people and very low-temperature causes problem to start the diesel engines. So, we are targeting to solve multiple problems through electric vehicles.

What challenges would the industry face to move to completely electric?

A lot more things have to happen in vehicles, and the mobility side in heavy vehicles. If the prices of electric vehicles come down to the diesel prices, we won't wait. The government is also talking about alternate fuels/ biofuels, but users are not much excited about it.

How are consumers reacting to digital technologies?

I found out two things – people who were close to retirement, lauded our new initiative, and younger people, got into the details and gave us suggestions. We have done this in machine monitoring, fleet management, and e-commerce.

Are you doing any R&D on any new products?

We are planning to bring in more products for the concrete industry. However, I cannot divulge more information on this. But you will find many things related to cement and concrete. The market is booming, so there is no need to wait. We will deliver when the products are ready.

Tell us more about the new state-of-the-art factory in Cheyyar, Tamil Nadu. What challenges did you'll face during the process?

The state-of-the-art integrated facility of 52 acres comprising of 50,000 sq m of the built-up area will now become a global manufacturing hub for Schwing's concrete boom pumps, stationary pumps, self-loading mixers, shotcrete pumps, excavators, wheel loaders, and motor graders. The new facility also includes a NABL Certified Quality Testing Lab and a custom bonded warehouse facility. Schwing Stetter India, which is the "Centre of Excellence" for training in concreting products is a partner to the IESC Skill Council and will be housing a modernised training centre at its new facility, which provides skilling to youth across nearby districts.



The newly-launched state-of-the-art factory in Cheyyar, Tamil Nadu.

Global manufacturing hub employs women workforce in the shop floor as part of an initiative towards equality and empowerment of women. This facility is created with all the amenities required by the women's workforce. This new facility is the beginning of our journey towards industry 4.0. The smart facility has taken all initiatives to be a sustainable manufacturing unit. The newly inaugurated facility will export to international markets across Africa to ASEAN and cater to the internal needs of Schwing's subsidiaries across the Globe. Having entered the export market of Bauma, Munich, and Eastern Europe, from this global manufacturing hub, we expect to enter Brazil, the USA, and GCC markets.

Building a factory during the pandemic and employing about 1,000 people at the job site when the permission was only for 500, was a challenge. We took special permissions to employ 1,000 people. Even if a few people get infected, we would have to reduce the strength by half. We made sure that nobody reached that type of situation. We were absolutely done with the safety aspect, as there was not a single incident recorded.

New equipment like a self-loading machine was brought. We wanted about 200 machines by April-September. Even one month before the inauguration date, we did not have a single machine to display. We made sure that we were taken care of for the next six months.

In the course of the journey to set up this factory, sometimes in 2019, the Finance Ministry announced that factories can have their own custom-bonded warehouses. So, we were the first company in Tamil Nadu to get the license to have the bonded warehouse.

During the same period, our design department got recognition for their in-house R&D. We have invested more in manpower, software, technology, and then we have created a prototype. With all that, we have geared up to bring in more products in 2022. We also set up a nationally accredited testing lab.

During the setting up phase, we also took a decision that boom pumps below 47 m will be manufactured here. Last year, there was a big supply chain challenge on getting the material, and availability of containers. We are going to increase in 2022 by two and a half times and substantial volumes will be going out of India.

Last year, we started supplies to Israel and Saudi Arabia for boom pumps. This year, we will try Germany and the US.

Are the inland waterways projects taking off?

A little bit of work is happening in Ganga but other waterways are still not active. Metro construction is going in full swing, roads, national highways will get awarded, and a lot of refineries will come. Ports construction and airport construction will be ongoing and there will be some revival in real estate. People have turned positive about the industry. I think the message of the last wave was "We will trouble you, but not harm you". Precautions will be there but people will not be worried about their investments. The situation is better now.

Any plans on expanding this factory?

When we started this factory, we didn't expect the place to be full so fast. Whatever products that we are manufacturing, this factory is sufficient. But, if there are any new products, we will have to build more sheds. If you see the land, where we have our custom bonded warehouse, we can have three more factories.

"ACE has always believed in innovation to achieve excellence."

- **Manish Mathur,** CEO – Cranes, Action Construction Equipment



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

ACE (Action Construction Equipment) is India's leading material handling and construction equipment manufacturing company with a majority market share in the mobile cranes and tower cranes segment. ACE is the most awarded company in the construction equipment sector for its value for money and innovative products, quality and timely service, customer satisfaction, and CSR practices.

Value for money would define the word "cost-effective" for us. We have always ensured to provide our customers with value for money products so that they can increase their productivity and profits by using ACE machines. All of our products are designed in-house keeping Indian operational and market conditions in mind. The very USP of our product comes from the fact that with the appropriate design we can control the costs to cater to benefit our customers.

Rugged, dependable, and cost-effective, these words themselves elaborate the strength of our products as well as our company. It has always been our endeavour to make dependable and reliable products for our valuable customers.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

All our products above 50HP are equipped with the current CEV emission norms compliant engine.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

The company provides the option of telematics, which in turn digitises the equipment. It helps the owners of the machinery to remotely monitor and supervise the various functional parameters of the machine and remain updated on its health and maintain the same to the optimum level for better performance.

The use of technology in machinery provides opportunities to improve the design and production of products using service feedback. This can reduce considerably, the overall cost of the machinery through its lifespan along with a reduction in material consumption.

Leaders in their arena, ACE has always pro-actively fulfilled each one of its customers' needs, requirements, and indeed wishes. Technology is now at center-stage and its use will not only be providing economically viable solutions for the manufacturers, operators, and customers but also environmentally viable solutions in the future.

At ACE, we are already utilising some of the best technology available worldwide, and we constantly work to upgrade and adapt all possible technology to Indian working conditions. Make sure nothing beats an ACE!





A wide range of products cover all segments of construction and the agriculture sector.

What efforts are being made to make your product more versatile and value for money for customers?

ACE has always believed in innovation to achieve excellence. The Group has introduced new technologies and new models across its product range at a phenomenal pace. The company has a diverse portfolio consisting of a wide range of products covering all segments of construction, earthmoving, material handling, and agriculture sectors.

R&D has been one of the key elements in our success story and our in-house R&D centre is duly approved by the government of India. Over the years, the speedy commercialisation of world-class designs and technologies in our company has been instrumental in making us the largest crane company in India. The core value proposition for ACE products is to offer "value for money products".

ACE has recently launched NX Series NextGen multi-activity cranes. As the name suggests, these new NX Series cranes perform multiple tasks apart from crane operations thereby adding versatility and providing multi-purpose utilisation for the users. These types of multi-activity cranes with articulated steering are the first in the world and ACE has already applied for the necessary patents for the entire series. We have also introduced a multi-activity piling crane model FP210, which can do piling activity like (a) cage handling / lowering, (b) concreting and (c) casing removal other than doing the normal loading / unloading and shifting of material at the site.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

We are seeing a lot of focus on climate and emission reduction across the globe and it will gain momentum to meet net-zero commitment by 2050. The automobile sector is already started witnessing an early stage of transformation to electric vehicle adoption and inline it is imperative construction equipment industry to adopt cleaner technology to reduce emissions moving forward.

Productivity is definitely a key factor in deciding the choice of technology or fuel type and right now there is a lot of work in progress to develop products with green technologies.

However, much needs to be done to fine-tune the alternative fuel technology/fuel type, availability, and related infrastructure to support the adoption.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

Developing versatile and cost-effective products is a continuous process. We had introduced new technologies and new models across our product range at a phenomenal pace. To cater to rising demands of the industry, we will continue to do so and our recently launched NX series and FP 210 are a testimony to this.

"Connectivity is key between automation and electromobility."

- Dimitrov Krishnan, Managing Director, Volvo CE India



The world is entering an age of robotics. Industrial robots have worked in the manufacturing sector for decades. Construction could be the next industry to undergo an automation transformation. Recent advances have made autonomous heavy machinery a viable option for construction teams.

At Volvo Construction Equipment (Volvo CE), innovation is at the core. With over 180 years of construction and innovation expertise, the company is at the forefront of technological development. **Dimitrov Krishnan, Managing Director, Volvo CE India,** who is also the President of Indian Construction Equipment Manufacturers Association (ICEMA), summed up the discussion on whether machine automation will ever take over in construction.

During a conversation, Krishnan pointed out three megatrends that will change the face of the automobile and construction equipment business. These include electromobility, connectivity, and automation. "Electromobility is yet to see traction in the automobile industry. Although in the western market, electromobility in the smaller equipment has already started. Volvo is one of the companies that has launched small excavators, loaders, etc., which are 100 per cent electric. However, this is yet to happen in India. Even in the European and American markets, electromobility is still in the early stages," said Krishnan.

He added, "Semi automation has started to get good traction in the western world, particularly in the machine control systems. So, even if you have workers with less skill, you can still achieve maximum results through this system. Full automation is happening only in specific sectors, and is not yet happening in full steam."

Speaking on connectivity, Krishnan had this to say: "Connectivity is the technology where you



Factors like fleet optimisation and fleet efficiency will be key focus areas.

will see clear traction, not only for analysing equipment but also to improve eciency in operations. Fleet optimisation, fleet efficiency, etc. will see clear traction in the coming one or two years. The construction industry has started to use these technologies now."

"Without connectivity, electromobility or automation is not possible. However, in the next 10 years, all these technologies will find their way into India," said Krishnan.

Moving toward sustainability

Caring for the environment and playing an active, responsible role in society have always been important to Volvo CE. Added Krishnan, "The industry is moving towards cleaner engines and has moved from BSIII to BSIV engines. Almost 60 per cent of what we sell is going into next-generation emissions, which will help out pollution levels caused by the machines to much lower levels. This is a huge change in technology. Obviously, it costs more on the product side, but it is also a product that will consume lesser fuel as compared to the previous generation, and will give far better quality."

> Semi automation has started to get good traction in the western world, particularly in the machine control systems.

Krishnan thinks that Volvo is moving in the right direction. "We also have off-highway equipment, which is still not being regulated. We need to bring them at par with the new engines. We are working with the government in this regard to implement it in the next 3 to 3.5 years. We also plan to replace a fairly large part of our products with BSIV engines by the end of this year."

"Many of the corporates have signed up for the sustainability journey. Volvo is committed to the Paris Agreement, and all the corporates have pledged to this initiative. You can see that new products that are being launched are already adhering to this," said Volvo's Managing Director.



"Our Indian products are now equipped with BSIV engines."

- **Hafeez Khan,** Managing Director, Manitou South Asia



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Customers always need a product that can increase their productivity. With that they also focus on saving cost on fuel and maintenance. Powered by BSIV Kirloskar engine, the Manitou telehandlers and backhoe loaders manufactured in India, comply with the new emission norms of India and with their fuel efficiency, the machine is for sure one of the best in the Industry in turn bringing more profits to customers .

The Manitou BHL BS IV was started with two variants - 74,5hp naturally aspirated and 74.5 high torque. We have now launched a new variant "MBL Ranger- 74.5hp" with a Banana Boom. The ECU coupled with the Common Rail Direct Injection (CRDI) system - provides higher output power and torque rises while offering enhanced fuel efficiency by 10 per cent. The engine mounted after treatment device used is DOC or diesel oxidation catalyst. The regionalised cooling system is designed to operate in demanding and extreme conditions of dust and high ambient temperature environment with ease.

Another initiative is saving the maintenance cost. When it comes to impeccable aftersales, we are twice as good, which is why we offer standard extended warranty for two years or 4,000 hour for our MBL series.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

Construction industry is getting more efficient day by day with new technology. With efficiency needs, users are demanding features like compactness, environment-friendly, etc. Manitou with its 60+ years of experience, is constantly investing in new products with new technologies and features which are fully aligned to the customer's demand and their various applications.

The focus on total cost of operation for the end customer is the focal point which has helped us to understand the customer needs more intricately. This also has helped us out in rolling out machines which are much more productive and reliable to our end customers.

We have a vast range of telehandlers that handle the diverse demand of the expanding market. For compact works, we have our skid steer loader, which is a pure example of versatility. We have our aerial work platform that comes in diesel as well as electric version which is environment-friendly. Our Indian products are now equipped with BSIV engines, which are more fuel efficient.

Manitou has also launched its 100 per cent electric range. The oxygen line includes a new aerial platform and a pair of telehandler models.

We have launched our first electric all terrain aerial platform with working height of up to 20 m, which works at par with current diesel powered platforms. Equipped with 48V battery, it can achieve up to one working day on full charge in adverse weather conditions.

The ATJ 200e Oxygen is the group's first electric all terrain aerial platform. With a working height of up to 20 m for a maximum capacity of 230 kg, the model provides the same performance as a diesel-powered version.

The MRT 2550 h Oxygen Lab telehandler is a hybrid prototype version of the diesel MRT 2550 model, capable of operating in 100 per cent electric mode. Retaining the same characteristics as the diesel-powered version, it has 25 m lifting height for a capacity of five tonnes.

We are ready and are excited to launch our hybrid products as soon as the Indian market is open for such hybrids.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-



The telehandler can be used for multiple jobs using a wide range of attachments.

end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

Manitou is always ahead in satisfying its customers. We listen and we work on what our customers need. Like our telehandlers now Manitou backhoe loaders also come with Manitou standard telematics called Easy Manager, which is now available by default on all our MBL's enabling the operator to have a digital twin of his machine on his smartphone with MyManitou App. Now our customers can,

- Plan their Manitou fleet better and optimise their business.
- Access live machine information like total running hours, fuel consumption, working function, etc.
- Track, trace and control their machine usage.
- Protect their equipment from unauthorised usage and get real time updates.

Not only it guarantees lower total cost of operations and higher productivity, but also maximises lifetime customer value.

What efforts are being made to make your product more versatile and value for money for customers?

When it comes to versatility, our telehandlers are just unbeatable. Manitou has evolved their telehandlers in a big way that can work in any environment whether in plain areas or rough terrains. These machines being rough terrain are majorly being used in India in various sectors namely infrastructure, construction, oil and gas, mining, logistics, etc. This list is endless owing to the large scope of applications opened up from their extensive range of attachments.

This machine can be used for multiple jobs using a wide range of attachments like floating fork carriage, tilting fork carriage, general purpose bucket, crane jib, frame mounted hook, extension jib, 4 in 1 bucket, construction bucket, platform basket, big bag handler, concrete skip, crane skip and many more. Our Indian telehandlers—MXT 840 and MXT 1740—are value for money products.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

The use of alternative fuels and electrification of vehicles is still in very nascent stages especially for the construction equipment segment. On a global level, there is an observation that the next big thing definitely is electric for mobility and productivity of the construction equipment. In no time, the same shift is expected to be seen in the country for electric as an alternate fuel. However, this will have a huge impact on the infrastructure as there is an absolute need of the charging points, their cost implications, government policies, frameworks, etc. All the favourable conditions can only make the electric as a reliable alternate fuel.

In terms of other sources like CNG or hydrogen, even though the demand is seen, it is very limited to some pockets where there is an abundance of gas availability. CNG/hydrogen can be kept on watch currently for Indian conditions.

In terms of productivity of the machines, the efficiency of design and engineering will be tested very rigorously since the site challenges are very dynamic and the responsiveness holds the key to productivity of the machine

But one thing is certain that Manitou keeps an eye on this ever changing technology. Our R&D team keeps on working on new alternatives, new designs. Because our core motive is to give benefit to customers as well as save the environment.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

Yes the increasing demand in infrastructure sector is pushing us to give more options to our customers. We have recently launched our new range of backhoe loaders – MBL series.

We have launched a new skid steer loader - 1340R with Yanmar engine, which is more compact and more efficient.

Talking about future products, as the market keeps growing; Manitou will be developing new solutions for material handling and construction equipment.

"CE companies are making strides toward sustainability."

- Hyunsoo Kim, MD and CEO, Doosan Bobcat India



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Customer centricity being the fulcrum, Doosan Bobcat India introduced B900 CEV stage IV backhoe loaders for the Indian market in 2021. With the rising market demand for advanced machinery and the enhancement in technologies due to mandates to adapt to newer emission norms, the associated cost for such advancements is borne by customers. Doosan Bobcat with its customer-centric approach ensures the Made in India Bobcat backhoe loaders paybacks customers with value addition right at the product design level. For instance, the B900 backhoe loader comes with a highly fuel-efficient Ashok Leyland engine, besides the largest fuel tank in its class, coupled with 10 per cent better fuel efficiency to ensure an approximate 40 hours of uninterrupted work giving us a competitive edge of around 12 hours. So once the tank is filled, the machine idle time is also relatively reduced to avoid refueling.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

As our environment is increasingly being threatened by the amount of pollution, Doosan Bobcat India turns its complete focus towards green initiatives by adapting to newer technologies and making eco-friendly equipment for a pollution-free environment. Bobcat B900 CEV Stage IV backhoe loader powered by H4 series electronic engine from Ashok Leyland is amongst the most reliable and proven engines working in the construction equipment segment. The engine produces more horsepower which emits a far lesser amount of smoke and offers great fuel efficiency. Usage of such fuel-efficient equipment is not only beneficial for the eco-system but for customers in reducing the overall maintenance cost. In addition, it helps in extending runtime, ensuring greater productivity and lesser time in refueling, and acquiring fuel, thereby, reducing total operating costs.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organization coping with this demand for customers, and how ready are your products to meet this demand?

Remote monitoring has become a vital parameter for the selection of equipment. At Doosan Bobcat India, every B900 backhoe loader is equipped with an exclusive Bobcat i-Connect Telematics Solution. This integrated solution helps our customers with all essential alerts on the machine's health, track live location, and remotely monitor information that enhances maintenance, security, and performance. Our customers can always stay connected with their Bobcat machine, anytime, anywhere from any smart device. The key machine parameters can be monitored remotely through mobile applications and the key benefits Include live machine location tracking, trip records, monitoring of engine RPM, fuel and temperature level, fuel contamination, battery disconnect alert, and fuel theft alerts.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we had to move to complete electric offering for the customers?

More and more equipment owners and companies are making strides toward sustainability and electrification, particularly in the construction equipment segment. Globally, we are the first to introduce a fully electric concept in a compact track loader machine. In India, we are



The market for backhoe loaders looks promising.

exploring applications and opportunities to introduce electric equipment in consideration of customers' requirements as the new electric prototype machines and concept machines are the next way Bobcat is changing the industry. Although there are many major barriers to the adoption of electrification in the construction equipment segment. Some of the challenges are infrastructure readiness, such as availability of charging stations, service stations, battery replacement cost, and so on. Besides downtime from charging, adoption to battery swapping and high-power charging solutions for heavy machinery equipment are also major challenges due to the remoteness of work sites and limited or unreliable access to electricity.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilize the opportunity? Are you planning to add more products in the future? Please elaborate.

With markets reviving to normalcy, the current trend looks quite positive. Currently, with manufacturing plants operating near normal, the construction equipment industry is now focused on catching up with the backlog caused due to the pandemic since 2020. However, the recent Budget's focus on encouraging the infrastructure sector is a transformative approach, particularly with the multi-modal transportations through Gati Shakti Master Plan, driven by seven engines - roads, railways, airports, ports, mass transport, waterways, and logistics infrastructure. With markets now in the rebound phase, and with anticipated growth through the Indian Government's National Infrastructure Pipeline, the infrastructure is gearing up with projects across all sectors. This is a great opportunity for us to catch up with the upcoming projects by strengthening our channel network and ramping up the production to meet upmarket demands. Doosan Bobcat established the Chennai plant as the global hub for supplying Bobcat backhoe loaders. With most of our global suppliers having local manufacturing facilities, we have the bandwidth to introduce more variants in the backhoe loader line-up, along with skid steer loaders and compact excavators.

What efforts are being made to make your product more versatile and value for money for customers?

While the backhoe loaders are preferred in both small contracts works and larger infra projects, the versatility offered for the Indian terrain conditions is what gives an edge over the other specialty equipment. The Bobcat B900 backhoe loaders have a much greater selection and are therefore capable of a wider variety of tasks. Unlike specialty equipment, they can also be driven on roads, which makes them the better choice for projects with spread-out worksites. Being multipurpose utility equipment that does the job of both excavators and loaders, they are widely accepted with great awareness and availability across the country. Buckets at both the loader end and backhoe end can be replaced with various attachments. The versatility, agility, low ownership, and operating costs, easy financing, good resale value, and a good network of Bobcat aftermarket support make the B900 backhoe loader value-for-money equipment with an everlasting demand.

"Use of advanced automation is transforming infra development."

- Saurabh Kulkarni, Mobile Automation Expert,
B&R Industrial Automation



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Today, automation vendors and OEMs are shifting their focus significantly according to the needs of their customers, i.e., end-users. This results in a wide-ranging transformation of products, solutions, and business models. In the equipment market, the teams of people who install and operate products may each have their own set of needs. At B&R, we satisfy various customer demands with modular, flexible, and integrated automation solutions. We collaborate with our customers and move forward with them together as they become market leaders.

Today, the growing industry demand results in more substantial and ever-expanding automation vendor portfolios. As it becomes harder to differentiate through hardware products, it becomes increasingly vital to distinguish through technology expertise, industry expertise, after-sales service, and support. B&R is renowned for consistently bringing innovative solutions, shaping the market, and providing the best-in-class service to its customers. With our "World Class Support" – a dedicated support hotline +91 83 80 800 008, we serve our customers a single point of contact. Our customers are already enjoying and appreciating this initiative which is helping to reduce response times and an enhanced customer support experience. In turn, this enables our customers to offer their end-users faster service and reduced machine downtime.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs, and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

Green initiatives are beneficial for our ecosystem, and they are also helping equipment manufacturers as they can decrease the overall cost of equipment maintenance. Realising this trend, equipment manufacturers are now developing equipment that consumes less energy and provides fuel efficiency. We already have energy and condition monitoring solutions in our portfolio to understand the need to save the environment.

With integrated safety technology and its economic and easy-to-implement condition and energy monitoring solutions, B&R is setting trends that bring sustained benefits for our equipment manufacturers. Our modular controls and I/O system are equipped with condition monitoring functions, which help detect problems like increased vibration levels or jammed components in their early stages and correct them before they result in unplanned downtime. This results in significantly superior equipment with less maintenance requirement and sustaining extended service intervals, saving a lot of resources.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

The machines provide an enormous amount of important data; this can be process data or data related to equipment health. However, collecting data is not just enough. Showing it in a form that an operator can visualise and makes necessary decisions by looking at the charts and graphs derived from collected data will make the difference. B&R is aware of this need, and our product family of power panels and T- panels very well suffice to the need for a human-machine interface.





The mobile automation portfolio ensures higher productivity, quality, efficiency, safety, and low maintenance in construction.

We also offer innovative software solutions, mapp technology components, and mappView widgets that help create powerful, intuitive, web-enabled HMI screens. These widgets in mappView are built on HTML5 are conveniently dragged and dropped into place on the desired page to create interactive screens.

What efforts are being made to make your product more versatile and value for money for customers?

Product functionality is critical to make any product more versatile and value for money for customers. The value of a product is the driver of the value of a company. If you aren't offering your customers something as per their needs, they obviously won't be willing to pay anything. Just the opposite, if the product benefits dismiss all the customers' issues and challenges, they'll be ready to pay for your products and services. While you can't stop the fluctuation of customer valuations, you do have the power to exert a positive influence.

Maintaining a healthy balance of keeping the customer first and ensuring that partnerships are based on a high level of expertise and lasting trust will allow a win-win situation for both parties. At B&R, we believe that loyalty, trust, and confidence in all areas are the hallmarks of a good, effective partnership.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

Demand for EV battery systems is expected to skyrocket in the coming years. To keep up with exponential capacity growth, battery cell production cycles must be orders of magnitude faster than for traditional automotive components. Batteries account for around a third of EV costs and are currently produced at incredibly tight margins. Growing production capacity is one part of the equation to reduce unit costs. The other is lowering energy consumption and increasing yield rates. Usually, to guarantee safety and avoid costly recalls, the parts are expected to comply with strict quality standards.

In addition, battery systems are more sensitive to contamination than traditional parts. All these issues are resolvable enough on their own. However, the question is: how do you do it without slowing down? In the race to market the latest battery systems, the champions will be those who make the most effective and sustainable use of their development resources.

B&R has many solutions to these challenges. Our mechatronic systems form the backbone of an adaptive manufacturing ecosystem. The independently controlled shuttles carry products along the track with variable speeds and spacing. The hard real-time synchronisation with robots and other equipment enables high-precision processing while the products remain on track and in motion at up to 4 m/s. Our digital twin solutions allow early verification of new factory concepts and lower the risk of letting fundamental design flaws go unnoticed until commissioning. With B&R's integrated hardware and software, our customers and partners enjoy peace of mind knowing production will start on schedule.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

The increasing use of advanced automation, industrial IoT, and robotics are transforming infrastructure development in many ways. We are a preferred automation partner for market leaders in Indian equipment manufacturing sectors with our most innovative automation technology solutions. Our mobile automation portfolio ensures higher productivity, quality, efficiency, safety, and low maintenance in construction and municipal vehicles. We are working with OEMs for various solutions covering all major infrastructure development requirements in India.

"Electrification will play an important role in defining the drive trains of the future."

- Kennady V Kaippally, Country Manager, Bonfiglioli India

In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Customer remains at the centre of defining all our activities and it starts with understanding customer's application and designing customised solutions, that consider the optimal performance requirements and deliver them in the most effective way. A well-defined set of processes, guide us through the complete product life cycle. Beginning with understanding the requirement, conceptualising the product, prototyping, testing, and industrialising, a customer-centric approach remains the cornerstone that defines these processes. These customer-centric processes have helped us to work closely with large OEMs who are leaders in their field and develop tailor-made solutions for their varied requirements.

Over the years, this has resulted in the development of a range of products, that are unmatched in the industry, helping us serve a diverse set of markets.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

It has been clear to us for quite some time that electrification will play a very important role in defining the drive trains of the future. This has been instrumental in our decision to develop a wide range of products for applications like a wheel, track, slew, drum, and various other drives, in which conventional drives have been replaced with electric motors. These businesses are gaining ground and we expect them to be engines of future growth.

In the short term, the biggest challenge the industry will face in moving towards complete electric offering remains technological, particularly when it comes to large production equipment. However, we are hopeful that the technology and infrastructure will evolve over a period to overcome these challenges and we intend to play an important part in this transformation.



700C Series



600WE



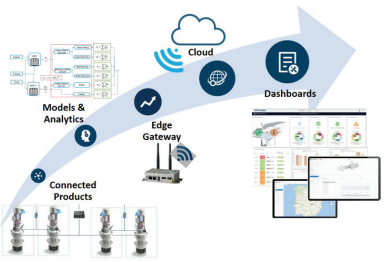
500 Series

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

Equipment monitoring and human-machine interface are becoming important for matching the ever-growing performance expectations of customers.

We have many solutions where electronic and hydraulic features are integrated into mechanical transmissions systems to provide an online feedback mechanism to equipment operators. One such solution is the integration of the load cell with the gearbox. This quickly and precisely measures torque and enables torque monitoring in real-time.

Connected via an external cable connection, the system provides an automatic engine shutdown to protect the drive or reduce the capacity of the frequency converter, while providing information to the PLC. In addition, the system also has an anti-seize function that prevents blockages. The evaluation of its data also facilitates predictive maintenance.



Connected products.



Predictive maintenance.



The factory at Thirumudivakkam, Chennai.

What efforts are being made to make your product more versatile and value for money for customers?

Our objective is to deliver a quality product, that delivers value for the customer over its lifetime. We make efforts to understand customer application, based on which an optimised product meeting the performance criteria of application, is defined.

Care is taken to ensure that the cost of ownership is minimised with innovations like lifetime lubricated grease that doesn't require top-up or replacements. The high amount of localisation of our product also ensures ready availability of reasonably priced spares. All these measures ensure we deliver value for money for our customers.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

An increase in expenditure for infrastructure development is much desired in an infrastructure deficit country like ours. This expenditure is going to drive the growth in earthmoving, road building, concreating, and much other infrastructures-related equipment. This will provide enormous opportunities for component and aggregate suppliers like us, who with over two decades of presence in India have gained a deep understanding of this market.

> Equipment monitoring and human-machine interface are becoming important for matching the performance expectations of customers.

We are prepared to fully utilise these growth opportunities and have expanded our facility at Thirumudivakkam, Chennai. The expanded facility houses modern assembly lines, R&D centre, and testing labs, all built with the highest standards of quality and safety, consistent with Bonfiglioli locations worldwide.

These expansions have enabled us to increase the production capacity and reduce lead time, helping us to better serve our customers.

"Electrification of CE is at a nascent stage."

- Dheeraj Panda, Chief Operating Officer (Sales, Marketing and Customer Support), Sany Heavy Industry India



Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

With the increasing climate change problem, our customers and construction equipment industries have become more environmentally conscious. The equipment manufacturers are now focussing on developing machines that would emit a lesser amount of smoke and give better fuel efficiency.

In line with these "green initiatives", Sany India has launched new truck cranes and motor graders adhering to the Bharat CEV Stage IV norms in the Indian market. In addition, our new machines are equipped with the multimode power output function, which consumes less power.

We are also exploring/ launching blended fuels like biodiesel-compliant engines. As electrification in heavy machines is gaining momentum, we are considering this electric solution under green initiatives.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

Indeed, both the evolving new technologies like equipment monitoring and Human Machine Interface (HMI) will change between the man and machine interactions. Looking into the



The newly-launched truck cranes and motor graders adhere to Bharat CEV stage IV norms.



The company is planning to launch advanced excavators in the Indian market.

technological advancements, we have already taken up a step with Sany's Telematics system, which helps monitor the key operational parameters and provide timely intimation to the users.

In addition, Sany India also offers an EVI app that helps customers and OEMs monitor every machine's operation and act swiftly to any issues, thereby enhancing agility. While, to further redefine the customers' experience, we are also planning to introduce HIM trends.

What efforts are being made to make your product more versatile and value for money for customers?

At Sany, we ensure that our customers always get extra value for their money through our cutting-edge technology and innovation. Besides advanced features like EVI app and Telematics, Sany India offers different attachments with their equipment, which makes them more versatile and economical. Moreover, our customer-centric focus drives us to develop reliable solutions for users. And in this regard, Sany India invests around a large chunk of its annual income in Research and Development every year.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

As the world is confronting the challenges posed by climate change, EV technology is quickly gaining momentum in the construction equipment market. To meet the increasing emissions regulations and provide sustainable equipment, Sany India is looking at electric solutions for its construction equipment.

Currently, the electrification of construction equipment is at a nascent stage. A major challenge would be to set up a good infrastructure to recharge the machines. Another challenge is likely to be range, performance, and compactness.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

With government investment focused on infrastructure development, India has become one of the key potential markets for construction equipment manufacturers. As many major roads and highways, and infrastructure projects are underway we would take this advantage by providing advanced machines to the users.

From excavators, cranes, graders, to piling rigs, Sany India offers a wide range of construction machinery with wide authorised networks in India. In view of the rising demands for construction equipment, we are planning to strengthen our product offerings by launching more advanced excavators in the Indian market soon.

"The world is transitioning towards sustainable business practices."

- **Anand Hariharan,** Head – Product Development,
Tata Hitachi Construction Machinery



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Our emphasis has always been to keep the customer foremost in our mind. We have therefore, laid special emphasis on customer-friendly products and solutions that are easy to adapt to and help in enhancing usability and serviceability. In addition to this, we at have institutionalised several processes to enhance our ability to continuously gather customer feedback through listening and learning posts geared towards this.

Our senior management, from our factory departmental heads to our Manging Director, frequently meet our customers to get direct feedback with respect to their specific requirements. Our dealers and dealer MDs are a key component of this feedback mechanism. Apart from this we also conduct regular customer visits to our plants towards this end.

Through these processes we constantly collect and analyse several layers and levels of feedback from customers, apart from direct feedback through our sales and service teams. These also include analytics data from our telematics systems as well as our CRM system from both the sales as well as service perspective. This data is then sent back to the product development team to further make improvements in our products.

These robust processes have led to several outcomes that have defined us a customer-centric organisation. We ensure greater proximity to customers through over 250 touchpoints covered by our 47 domestic and four international dealers. We also continue to invest in aftersales support through our dealers in terms of diagnostic vehicles, mobile workshops and increasing numbers of outlets, so that we are within reach of the customer in the shortest time possible.

We have accorded special focus to the following approaches in terms of after sales support:

- Increasing availability of spares through



The state-of-the-art plant assembly line.



regional warehouses to minimise parts delivery lead time
- Fleet of Field Diagnostic Vehicles (FDVs)
- Parts availability on e-commerce portal
- Customised maintenance kits for all products
- Skilled service team for on-the-spot trouble shooting.
- Training customers on best practices for maximum up time of machine.
- Toll free number for 24x7 support.

We have continued to enhance our presence in digital communications channels, where we are seeing great traction in terms of audience participation as well as engagement. We have conducted several product launches on social media channels, which have proven to be valuable as well as cost effective.

Our digital connect platform, e-Dost, which provides a seamless digital experience, has augmented our capability to engage with customers. This platform enables our customers to transact with us on sales as well as aftersales requirements virtually. While physical connect remains an integral part of our sales activities, we continue to invest in digital technologies and enhancing the skillsets of our employees to ensure smooth continuity of business operations. This is especially important in the post COVID-19 world, where it is imperative to be to be prepared for unanticipated disruptions like lockdowns. In addition to the above, our corporate website, as well as our website for used equipment has seen increased activity,

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

The world is indeed rapidly transitioning towards sustainable business practices and even consumption models. The customer is also today more aware of the need to adapt to sustainable business practices. We at Tata Hitachi are also keenly aware of the urgent imperative to adopt environmentally sustainable practices in our design, processes and products.

In line with this philosophy, we have ensured that Tata Hitachi products are extremely fuel efficient both through superior hydraulics as well as engine technology. This has enabled us to significantly reduce emissions load.

The regulatory environment is also increasingly supportive of cleaner emission norms, and we at Tata Hitachi have constantly utilised this opportunity to provide newer engines following stricter emission norms. We are also working on several projects including alternate fuels. We are also complying or exceeding statutory norms for restricting the use of non-environment friendly material in building and operating our machines.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

We have accorded special focus on ensuring the safety and comfort of operators to ensure that the human interface of the machine is the highest standard in terms of ergonomics, comfort and safety. All Contact points of operator with machine use the highest grade of materials geared towards this. In addition, the layout of the cabin is designed in such a way that it promotes better access, more comfort and high degree of visibility. We are also perpetually improving on this to introduce newer systems to enhance operator experience.

In terms of equipment monitoring, telematics and digital technologies have enabled to bring the worksite to the palms of the project manager. Digital evolution has ensured integration of telematics data with the project team's internal ERP as well as seamless flow of information between the machine and the system. It has therefore become easier to plan optimum outputs, schedule maintenance, keep a tab on operation costs, monitor health and productivity of equipment, as well as to make more accurate time projections, which were earlier more heuristic in nature.

While most OEMs offer telematics solutions, Tata Hitachi's in-house ConSite system is the first and probably only system which offers recommendations to the customers based on their performance and gives a comparative picture comparing it against the regional average. This helps the owner to identify areas of improvement and to even monitor improvement.

Our detailed troubleshooting guide is also another area which goes a long way in reducing the breakdown time of the machines usually lost during fault identification and resolution in other machines. Tata Hitachi also has its ears on the ground to identify the challenges being faced by our customers in their operations and are working relentlessly to offer solutions that will help improve the profitability of the customers.

What efforts are being made to make your product more versatile and value for money for customers?

Increasingly these days, the requirements of





The company's plants at Dharwad (left) and Kharagpur.

the customer are not just standard machinery, but equipment that is suited to specific requirements, that call for a high degree of customisation. Several modifications have to be made to factor this in, which may range from changing machine reaches to removal of unnecessary components aimed at specific applications. The aim is to make our machines more customer friendly as well as more versatile.

We also lay special emphasis on reducing costs throughout the machine's life cycle, from acquisition to operating to attachment costs. This is done in two ways. One is using cutting-edge advanced technology in our machines that enhances productivity. The other is by enhancing the durability of our machines, which leads to reduced downtime, higher maintenance and refill intervals thereby significantly lowering maintenance costs.

What are the plans for electrification of the offering by your organisation? What typical challenges do you think the industry would face if we have to move to complete electric offering for the customers?

The average customer in the Indian CE industry is highly price sensitive and has been extremely cautious in trying out alternate fuels, either due to increased costs or lack of availability. We must also factor in the time lag between customers in more developed countries vis-a-vis Indian customers in switching to alternate fuels and energy sources.

In addition, these fuels should be sustainable in terms of not only their own availability, but also the availability at scale of engine technology that can run on these fuels. Without such scalability, it may be cost prohibitive in terms of investment for both OEMs and engine manufacturers.

Having said that, we do have technologies available with respect to different types of electric drives with our principal, Hitachi Construction Machinery (HCM). We can access these technologies at any point to introduce machines in our market, should the need arise. However, these introductions will largely be driven by needs of customers, their buying capacity, and their willingness to change and availability of engines that can use alternate fuels.

We should also bear in mind that electrification of construction equipment would require large investments on the part of end users for providing constant electric supply to the machines in the field. AT this juncture, very few customers have been able to do this in large mining applications. This technology is currently almost non-existent in other applications like construction, road making and irrigation among others. Without dedicated infrastructure for electric machines along the lines of electric passenger vehicles, or mining applications mentioned above, the viability will come into question given the challenges of scale.

As mentioned above, we are monitoring situation closely, and electric drive engines are already available with our parent HCM, and we are primed to offer the same in the Indian context when the opportunity presents itself and the and the ecosystem is ready for the same.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

We at Tata Hitachi put in special efforts to forecast market trends based on the infrastructure development plans being rolled out by the government. Strategic initiatives are taken by the top management to invest in new product development accordingly.

Resources have been enhanced in the areas of engineering design, development, and testing. This has led to a faster rate of development and introduction of new products than compared to previous years.

We are also monitoring various application segments and analysing gap areas on our product portfolio to develop products better suited to customer. We are constantly working on this, with several new products on the anvil.

ARX 90.2 ARTICULATED TANDEM ROLLER
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"We have embraced digital transformation."

- **Debasis Bhattacharya,** Head Sales and Marketing, AJAX Engineering



In today's competitive arena, equipment suppliers need to be more and more customer focussed, driving more customer-centric processes. Could you please share such initiatives with your organisation?

Customer experience is the most important part of doing business. It involves optimising every customer touchpoint, be it pre-sales, point of sales, or post-sales to always ensure customer satisfaction. Created a customer-centric approach within the organisation by developing customer-centric strategies, and introducing loyalty and engagement programmes.

We at AJAX involve the operator in the equipment maintenance programme thereby offering them the required skill set to ensure the optimum working condition of equipment at all times. Also, ensure to keep as float stock at the key dealer locations to reduce the TAT time in case of any mechanical failure.

AJAX has a wide network of dealers for product sales and after-sales support across the country as well as in markets outside India. Currently, 35+ dealers in India with 100+ touchpoints are available to cater sales and services for the customer. AJAX is also serving the international market through 16+ international distributors and has its presence in Asia-Pacific, the Middle East, and North Africa (MENA) regions

The full-fledged team of skilled engineers of AJAX is trained to handle both preventive and general maintenance of the machine. AJAX with its wide network of dealer service centres across the country offers maintenance, repair, and overhaul (MRO) equipment to ensure the best value for money to customers. AJAX customer care can be reached 24X7 for any queries and requests, thereby enabling round-the-clock support. AJAX offers excellent serviceability options to ensure maximum uptime of the machines thereby enhancing customer satisfaction to a greater level.

Growing customer demands are fuelled by tools and technology, employees with greater autonomy can facilitate customer needs and offer empathetic, pro-active service, provided by ESPC is one of the examples.

Nowadays, customers are becoming focused on green initiatives and savings in fuel costs and leaving a lesser carbon footprint. Could you please help us understand the green initiatives on product development undertaken by your organisation?

Over the last three decades, the need for energy efficiency, higher productivity, easy mobility, and flexibility has been our focus to meet growing customer needs. We at AJAX working on CAT engine with biodiesel. we are offering our customers the latest technology products with BSIV engines. Our ARGO 4800 has an electronic drum control unit that ensures the change in engine RPM does not affect the drum rotation for the smooth operation of concrete mixing. This feature helps in homogeneous concrete mix and effective cleaning of the drum.

Equipment monitoring and increased Human Machine Interface is a new Mantra in the high-end construction equipment industry. How is your organisation coping with this demand for customers, and how ready are your products to meet this demand?

Our endeavour is to provide the best concreting business solutions, which are driven by innovation in technology. We have embraced digital transformation to offer innovative products and services basis our engineering knowledge about the concreting segment. We have diversified the application of Artificial Intelligence, Machine Learning, and the Internet of Things in our operations to provide 360-degree solutions which are at par with the global standard.

Our SLCM is equipped with the latest Telematics solutions – "AJAX Smart Fleet". The key benefits to customers

- With every critical part of the machine being connected to the internet, our customers can



The company provides 360-degree concreting solutions.

easily monitor the machine function from anywhere.

- Our customers can monitor (24×7) the performance and productivity of the machines while they are busy elsewhere.
- Track machine location from anywhere through mobile app and auto notification send to customer mobile for coming service schedule.
- Monitor the health and performance of the engine and another critical path continuously.
- Access the report via web and mobile app. Get critical alerts and proactive maintenance suggestions

What efforts are being made to make your product more versatile and value for money for customers?

A company that truly believes in the "Made in India; Made for the World" mission. We introduced India's first all-new CEV Stage IV compliant ARGOs that offer the best-in-class benefits with excellent fuel efficiency as well as less downtime due to longer service intervals ensuring very high reliability due to our high-quality standards. We have widened our batching plant's portfolio with the addition of 45 cu m and 75 cu m batching plants and we have also increased our models in the concrete pumps keeping in mind the different customer needs and applications. Keeping pace with the changing requirements of customers, AJAX has developed a first-of-its-kind self-propelled boom pump – a complete solution that is built on AJAX's own chassis with 4x4 transmission, three-way steering, a lightweight compact design, and a fuel-efficient engine. The 25-m boom pump mounted on this chassis has a revolutionary design to utilise the full boom length to reach unreachable spaces in less accessible areas and deliver concrete effectively. The smaller tight turning radius is the major differentiator between the conventional boom pumps as it enables better maneuverability at confined site conditions. AJAX has also designed and manufactured India's first and only slip-form paver to build concrete roads up to 12 m thereby eliminating the need for customers to import Pavers from outside the country. Now we have also developed a 7.5-m slip-form paver with full-length DBI.

With the heavy increase in the expenditure for infrastructure development in this country, how do you think you are going to utilise the opportunity? Are you planning to add more products in the future? Please elaborate.

The roadmap ahead for AJAX Engineering is that of being a next-gen 360-degree concreting solutions company, we have aligned ourselves in line with the government's investment plans in the Indian Infrastructure segment in order to cater to the requirements of customers from residential and industrial building projects to metro rail corridors, railways, irrigation canals, aqueducts, solar power plants, road tunnels and bridges, airports, and railway infrastructure to smart city projects, our concreting solutions have been a preferred choice of contractors across the country. In the coming years, most of the growth in the construction industry is likely to come from 3 main segments - the Urban Sector, Rural Sector, and the Transportation Sector wherein the demand from the government is expected to rise with growing infrastructure expansion plans. we see ourselves emerging as an Indian MNC and becoming one of the top three international players in the concrete equipment space.

"Use of automation in road construction may increase."

- Sandeep Mathur, Brand Leader, New Holland CASE Construction Equipment



Share insights on technological up-gradation that has happened recently or might happen in near future in the construction and engineering business.

One of the ongoing evolutions in manufacturing machines that offer better fuel efficiency. There has been an increasing trend of manufacturing lower HP machines that also save operating costs. Electric vehicles are the new trend in the industry and manufacturers are working to build well-equipped machines that cater to customers' needs. Soon, the industry will witness electronic vehicles at the disposal of customers, which will have various features to fulfill the demands of the customers.

The construction and engineering businesses are adapting to the rapidly changing situations along with the government norms about electric vehicles. The government is also bound to make quick changes in the sector and these upgrades will be a part of the system in no time.

How do you look at the overall performance of the mining sector in India?

With the mining sector being one of the core industries of the economy, it has witnessed year-to-year growth. In terms of trends, there were positive signs in the manufacturing and mining activity that recorded a higher relative growth performance last year.

Besides, there is a tremendous rise in infrastructure development. The power and cement industries are supporting the growth of the mining sector. India is a huge market, holds the advantage of reduced manufacturing cost, which gives space for other expenditures in the industry. As per reports, the Ministry of Mines has handed over 152 mineral block reports to different state governments until November 2021.

Opportunities are booming with a few setbacks in the sector and the mining equipment industry is hopeful for a rise in demand due to new mining activities and government support in the infrastructure sector. However, there is a definite scope of improvement in the overall sector.

What is the current market size of your products? Which segments are driving the demand for these products?

In terms of market size, the loader-backhoe market is around 40,000 units a year while around 4,500 compactors are sold in India every year. Excavators are one of the largest manufacturing products in the country and are expected to grow more over the years.

One of the major demand drivers is an increase in demand for underground mining equipment and a rising need for mineral fertilisers to improve agricultural yield. As the industry is governed by a federal system and various policies are introduced in the system, the demand affects the basis of the concessions, incentives, and applications. India is one such market, which allows exporting in large numbers and this acts as one of the demand drivers. As the government plans to introduce further reforms, the preference may tend to change gradually and the focus of the segment may shift depending on the regulations.

Further, increasing road construction projects, the use of technology and automation in road construction and mining may increase. Such bigger projects would need sophisticated, high-quality equipment for efficiency and safety. The government's large expenditures in infrastructure measures and reforms in the mining industry are undoubtedly boosting growth. In addition, the Union Budget 2022 anticipates significant expenditures in infrastructure and mining, which will benefit the industry.

In light of the plans of infrastructure creation and reforms in mining, what opportunities do you foresee for construction equipment?

To cater to the rising demand, manufacturers have set ambitious goals to participate in the transformation of infrastructure in the country. The new mining reforms have indeed aided tremendously to the sector by boosting the business process, increasing productivity, employment, revenue, and continuity in managing operations.

As per reports, coal production in India stood at 715.95 million tonnes in FY 21 and the industry



is picking up after the fall during the second wave of the pandemic in 2021. There is scope for new mining capacities and hence there will be considerable opportunities for the mining equipment industry to manufacture and sell best-in-class equipment to support the ever-rising infrastructure projects.

Therefore, we foresee a considerable rise in demand and are excited to see what the future holds with more reforms coming up.

What are the latest products and solutions from the company for mining applications?

CASE has various products for mining applications that are equipped with smart features and offer efficiency and maximum productivity. The products offered are the new Series C GR 865C Motor Grader, 2050M Crawler Dozer, and CX220C Excavator.

Series C 865C Motor Grader, fitted with the best-in-class fuel-efficient electronically controlled FPT Engine with variable Horsepower at 2.200 rpm - 193HP /205 HP / 220 HP is ideal for mining applications. FPT engine helps Grader deliver maximum performance with minimum fuel consumption in rough terrain around mines. 865C is fitted with a mouldboard in the form of an involute curve. This reduces the load on the blade and hence results in better productivity and excellent fuel efficiency. CASE Graders are also equipped with a hydraulic system with a load sensor (variable displacement, pressure, and flow compensated) which allows operators to easily control the mouldboard from the cabin thus offering high productivity as well as operator comfort. CASE Graders also have an air conditioner for a closed cab, fire extinguisher, windshield washer and lower windshield wiper, tandem lock device for better operator comfort and safety, which is essential in tough applications like mining. Fitted with a medium ripper rear pull hook to provide support for lifting the machine offers best-in-class serviceability, and outstanding visibility, the 865C is both easy to maintain and extremely durable.

CASE 2050M dozer is powered with FPT Industrial 6.7 litre six-cylinder engine. Equipped with hydrostatic transmission to provide best in class drawbar pull capacity and lower maintenance and operating cost, 2050 M Dozer is best suited for tough terrain conditions like mining. The 2050M also features automatic blade functions, further increasing the operator's efficiency. Easy service and maintenance are achieved through easy access to ground-level service checkpoints. The cab can be tilted to provide full access to all main powertrain components. The operator can customise all the working parameters of the machine to achieve excellent controllability and faster cycle times. The automated functions in the cab, which include an electrohydraulic joystick to customise the reversing and steering sensitivity, make the drivers' job easier, allowing them to achieve shorter cycle times and boost their productivity.

CASE CX220C Excavator, launched in December 2020, is specially designed for the toughest applications. Fitted with a powerful and reliable FPT Industrial engine to ensure high productivity with low fuel consumption, this equipment is ideally suited for quarrying and earthworks around mines. Its robust design, with 33 per cent stronger heavy-duty arm, boom, and undercarriage structures improve the machine's durability in the harsh mining terrains. It is easy to maintain from the ground level, which makes it a good choice for the user.

What can be the possible challenges in the post-Covid scenario?

Overcoming the extraordinary event of the pandemic, the mining industry has risen to the challenge and found innovative ways to sustain itself in the business. Although the situation has stabilised over the two years, there seems to be some disruption. In addition to tackling climate change issues, there is a need to create fundamental changes in how companies operate. Collaborative actions will have to be taken to continue smooth work operations. In the manufacturing space, companies will face the challenges of training, skilling, and sustaining employees. Taking care of the safety of workers will be one of the topmost priorities. In addition, adapting to the digital environment will be at a slow pace as mining and metal companies have limited talent. To tackle this, there is a need to create awareness and educate people about the industry to attract employees that are more skilled.

Overall, creating a purpose and following a goal, which involves innovation, collaboration, skilling and digitalisation can help the industry tackle the situation post-COVID-19 pandemic.

How do you look at the opportunities for the mining equipment market after the mining policy revival?

As mentioned earlier, the industry is working towards introducing mining equipment in the market and expanding the volumes gradually.

As the scope of mining activities increases, the opportunities may vary. Further, there is immense scope for exporting which will definitely keep boosting the Indian business, therefore increasing opportunities for mining equipment in the market.

"Construction segment requires innovation in all areas."

- Tony Van Herbruggen, GM, Atlas Copco Power Technique, Atlas Copco India



Share insights on the technological up-gradation that has happened recently or might happen in near future in the construction and engineering business.

Expectations from the Indian market will continue to focus on infrastructure projects by offering products that meet our customers' needs and ensure their long-term benefits. India is a growing economy, and looking at the overall infrastructure requirements coming up, we expect this healthy trend to continue in the coming years as well.

The construction and infrastructure segment today requires more innovation in all areas of core infrastructure such as roads, metro rail, expressways, airports, and expansion on existing highways. At Atlas Copco, we have products to match this requirement. We offer a range of portable air compressors for quarrying applications.

With time-bound projects and the need for 24 by 7 action to ensure on-time completion, technology that ensures reliable light on-site, brings in the required support for meeting the infrastructure project deadlines.

We are listening to the customer and are continuously innovating to match our compressor offerings to customer needs. We have launched next-generation portable air compressors with breakthrough technology in the mining segments. We also undertake many field trials and invest more than a year of R&D before launching any new products. A customer always sees the value he will get from the product he is buying. Therefore, other than launching new products, technology advancements are always in our pipeline.

What is the current market size of your products? Which segments are driving the demand for these products?

Mining is one of the major segments besides infrastructure, quarrying, and water well for the portable compressor business. With the increased focus on road development and the revival in the mining and quarrying segment, there is continued demand for portable compressors.

The new policies on mineral mining are further fueling the mining sector's growth. Our portable air compressors play a pivotal role in mining applications. The mining application specifically, is a segment of paramount importance, looking at the number of minerals, which are required for infrastructure and construction projects.

How do you look at the overall performance of the mining sector in India?

The mining sector is a segment of paramount importance in India, looking at the number of aggregates, which is required for infrastructure and construction projects. All the infrastructure and construction projects start with excavations where portable compressors are required and then the entire work chain starts. Portable air compressors play a pivotal role in infrastructure, construction, and mining applications.

Similarly, the extraction of minerals such as coal, iron ore, manganese, etc. with reliable portable air compressors with the lowest possible energy consumption is an important application under metal mining.

Overall, the mining sector is showing positive signs of growth recovery and huge market potential.

In light of the plans of infrastructure creation and reforms in mining, what opportunities do you foresee for construction equipment?

The construction sector has been impacted by the onset of the Covid-19 pandemic. As the projects resume, it is important to navigate the recovery phase well. The project implementation cost may go up and will experience a likely delay of a few months. Priority should be given to the clearance of pending projects and completion of projects nearing completion, which could act as a quick win for reviving the economy.

The construction sector in India is very important as it contributes to around 60 per cent of the total investments; it will come back strongly to support the economic revival.

India is a growing economy, and the construction and infrastructure segment today requires more innovation in all areas of core infrastructure such as roads, metro rail, expressways, airports, and expansion on existing highways.

We have the products to match with our upgraded portfolio and technologically advanced portable air compressors and light towers, which will continue to support key applications in infrastructure, mining, and construction projects.

What are the latest products and solutions from the company?

With a continued focus to power the future with innovative technology, Atlas Copco sets new benchmarks in the portable air compressor segment, with the launch of forward-thinking compressors and an extended light tower range. Our portable air compressor portfolio ranges from 160 cfm to 1250 cfm, 7 bar to 35 bar covering diverse applications. Below are some models that demonstrate how we lead innovations, and change the market dynamics in the mining sector:

Lower carbon footprint and green energy focus: Our electric range of portable air compressors offers higher KW from 45kw to 160 kW. We are undisputed in the above 90KW category. We offer breakthrough technology, which impacts overall productivity and efficiency.

Reengineered technology for higher efficiency: The XAS 450-650 cfm range portable air compressor with four variants in its class is the new technology driver in the 450 – 600 650 cfm range of compressors to cover a wide range of applications such as blast hole drilling, shotcreting, and DSI (Dimensional stone industry).

One compressor, many applications in segments such as mining, roads, infrastructure, and special applications: The XAS300-100, XAS400-100 portable air compressors are upgraded versions of the current XA 157 and XA187 models.

All Atlas Copco compressors are designed to reduce carbon footprint with energy-efficient advanced screw elements, the best in the market, which delivers high flow at committed pressure with fuel efficiency.

All our compressors are service friendly with one side service and modern operating controls such as FleetLink technology from Atlas Copco is a tool, which enables customers to monitor and control their machine fleet efficiently and conveniently. Other digitalisation tools such as Power Connect LIVE, which is a remote augmented reality-powered video assistance service, allow our technical support team to solve



The compressors are designed to reduce carbon footprint with energy-efficient advanced screw elements.



The Chakan plant is 19,000 sq m and is built in accordance with LEED.

machine problems remotely. Mobile apps such as PowerHub for Atlas Copco field service engineers, dealers, and PowerCare for Atlas Copco customers ensure communication and connectivity.

We focus on continuous innovations including on engines and other ways to reduce the carbon footprint while improving customer productivity & profitability.

With the launch of the HiLight V5+ LED light tower, a two-cylinder engine with 350W LED bulbs. The HiLight V5+ can illuminate an area of approximately 5,000 sq m with an average brightness of 20 lux.

Key features:

- 1st CPCB II compliance for the entire light tower in India
- Hardhat® canopy ensures robustness, no rusting, and higher resale value
- Fuel savings of up to 60 per cent compared to metal halide
- LED lamps are made as per IK08 and IP67 standards

As we stand at the threshold of a new era, we will continue to educate the market through timely and relevant demos where the customer experiences our SOLUTIONS first hand rather than just our products, therefore accepts technological advancements, and embraces the paradigm shift in the true sense.

What is the level of indigenisation, and what is the dependence on China?

Looking into the requirements for infrastructure, most of the manufacturing units are either investing in expansion or companies like Atlas Copco are turning to more efficient methods of production thereby enabling increased manufacturing capacity within the existing resources. In fact, Atlas Copco has invested in a Greenfield state-of-the-art factory, wherein we have the latest manufacturing technology, which is ensuring a higher manufacturing capacity.

The Chakan plant is 19,000 sq m and is built in accordance with LEED (Leadership in Environmental Energy and Design), is based on an IGBC rating system, and has a rainwater harvesting facility and solar panels for powering the plant. The main goal is that we should be able to serve the market demand and need for the latest innovations in technology and on-time deliveries on site.

What can be the possible challenges in the post-Covid scenario? How do you look at the opportunities for the mining equipment market after the mining policy revival?

The years 2020 and 2021 have been exceptional years and the pandemic has affected projects worldwide. In 2022, we look forward to infrastructure and mining projects getting kick-started giving us continued opportunities to touch lives and improve the infrastructure needs of people in India. We expect slow and staggering growth in the short term due to the current Covid-19 third wave, but expect stability and better growth in the long term.

"Electric mobility is the segment we focus on most."

- Amit Verma, Head – Business Development, Kessler Drive Systems India



Tell us about Kessler as an organisation and the activities you are in?

Kessler, as the name suggests, has a long history just as any other German /European company, and is being run by the third-generation family and closely linked with the southern German region.

Alfing Kessler, the founding company that produces heavy-duty industrial forgings, is still in place. In 1950, Dr Albert Grimminger, who was at that time the part of Alfing Kessler, acquired a stake in a small axle company. From there, the formation and great success story of Kessler & Co took place. Dr Grimminger never changed the name of the company; Kessler is still there even though it has no direct relation with the Kessler family or Alfing.

Now the company is around 75 years old and is primarily into specialty off-highway axles including military axles. The company does not deal with conventional on-highway truck axles or commodity driveline parts. Kessler has also specialised gearboxes in its portfolio, but these are very different ones, which are used in an all-terrain crane for example. The product portfolio is too big to the extent that if you come to Kessler's shipment warehouse, you will find all axles, transfer-cases, and gearboxes, every product is different from the one other.

What is the current market size for your products? Which are the segments that are driving demand for your products in the region?

When it comes to the company as a whole, Kessler deals in 15 primary applications. There are many more specialty applications in the military and aerospace. In India, out of 15, we are doing about five to six.

In the mobile crane segment, you will find a lot of Kessler axles and various other products. Another application is the ground support equipment. These are the axles for the aircraft pushback tractors. There are also axles for a low-flow bus to bring passengers from the boarding gate to the aircraft and back.

Most of the global aircraft rescue firefighters have Kessler axles and T cases in them. These are not the conventional firefighters that we see in India. These are very different because the speed is too high; they not only pump the water but also run at a very high speed. Ground support is one of the primary applications.

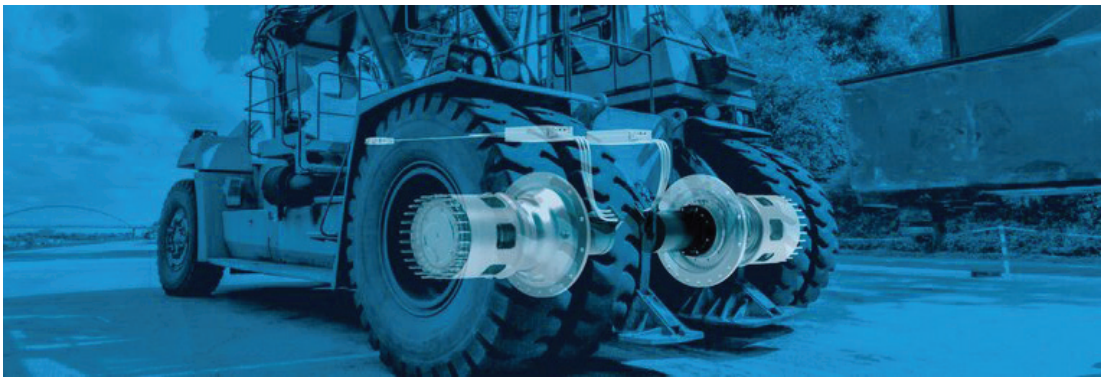
Then we have all kinds of medium to heavy-duty forklifts, container handlers what we call in the totality Port equipment applications. These are reach stackers, heavy-duty forklifts, and the container handler as one part. The other parts are rubber tyre gantry cranes, harbour mobile cranes, straddle carriers, and automated guided vehicles. In this, we have been providing solutions for several decades.

The other important application in Kessler is mining, especially underground mining. We do have applications in surface mining and shallow mining trucks, but these are very heavy duty and super special in some very critical applications of the mining area.

The other Kessler application is agricultural machinery. Kessler does not deal in single reduction axles. They are meant to drive the vehicle at a speed. In agriculture, the company deals with combined harvesters. For e.g.: a Sugar-feed harvester is very critical and heavy-duty in industrialised agricultural fields. For the driveline components that have failed in the technical purpose, Kessler pitches in. We do not mind giving one or two prototypes a year and are always keen to be a development partner of a new model or programme.

The military is another important application. Whether you need vehicle mobility, Kessler is always there. We also have Transfer case solutions for military applications.

Last but not the least, electric mobility is the segment we focus on most from a technology perspective. With our experience and our understanding of the system, we are also



increasingly offering individually tailored electric drive system solutions for all applications and intend to further expand our portfolio in this segment.

Which new markets you are eyeing up to scale up your business in India and around the region?

From the lens of Kessler, the country is still not very industrialised by the nature of applications when compared to the industrial nations like China, Japan, Korea, Continental Europe, the USA, and others. However, we see a great future for our applications and products in India in long term.

We have a good history in the port equipment market and material handling. We are now getting some traction in mining applications. Because of one of the largest mining countries in the world, we have a long way to go.

What is the new product that you are trying to bring to India?

The new product in India is a traditional product from Kessler. We have seen some interesting applications from our experience, which are not there in many developed countries. In prime moving applications, to transport a boiler, from one place to another. These very different applications are not available in many countries.

So, what are the challenges that you are currently facing in India and globally?

At a global level, material cost explosion is what we are facing for almost a year now. It is hitting not only us but also our customers, OEMs. Because of this cost explosion, there is a disruption in the supply chain. Once the cost is increasing, you have to spend a lot of time negotiating and re-negotiating – with both the suppliers and the customers. And we do all these efforts to keep our delivery performance at the highest level which is always key for us.

Because of Covid-19 [fortunately or unfortunately], the industries in which we deal, have not been hit to the extent that it has others. In ports equipment and trucks, our industry is making record sales. If you go to China and ask for a brand-new stacker, it will get 12 months to get a new one, and you will have to pay a hundred percent in advance. If you have to get an axle from Kessler, we are working with the 2023 production plan. The year 2022 is just already booked.

Therefore, there is the material cost explosion, supply chain disruptions, and order board is not a problem. These are good problems to solve but they are all coming at the same time.

From the Indian perspective, the order book is still looking very good. In fact, we are breaking records this year. The challenge in India is the cost versus price. India being7 a commoditised market, every discussion starts with a cost. It does not start with the value, application, specification, quality, performance, reliability. We see this as a challenge and opportunity.

That is interesting! Still, you have over a 90 per cent market share in the industry. I am sure there must be some scope for new innovations where you see the future.

We have a presence and a full-fledged organisation in China, North America, and now India, we have a representative working in Japan and Korea. As a company, we are centralised, every engineering-designed application work is done in Germany. We do have a warehouse in North America and China, and the scale of shipments is very higher than those in other parts of Asia.

As for now, we have four plants located in Germany. Our four plants, one which was commissioned last year, are working in 100 per cent production. So far ideology was to keep things in one location and continue to support the programmes across the world, but at present, we are also discussing extending production to India or China.

So as mentioned earlier about China and the overall business on the Chinese supply chain side, do you have anything from China in operations?

A lot of commodity items like forgings and

castings. We also buy those from India, Korea, and Thailand. These are not of a major impact but are minor or reasonable disruptions. These disruptions are not hitting our supply chain very much. For example: earlier if the production lead time for our products used to be 12-16 weeks, because of disruption, it is around 18-24 weeks.

How did your company deal with the difficulties during the Covid period?

Because of Covid, most of the ports were busy transporting goods like vaccinations, masks, kits, PPE kits. So, most of these goods are loaded in the container and transported through the sea, which makes the seaports entirely busy. You will be surprised to know that the last two years were the busiest time for the ports. So one of the important industries for us is the ports. Stackers, containers, handlers, harbour mobile cranes, and all the other machines are working for 22 hours a day. This is the reason why there is a boom in the industry. Mining activities have not stopped regardless of Covid. Social distance norms are easily manageable in mining areas. Therefore, mining is largely untouched by this.

> We see the next 15-20 years to be very interesting for India. We are trying to scan India for our global sourcing model.

Similarly, many construction sites are also working all over the world. They are re-motely located and follow the social distancing norms. What is impacted highly is the normal transportation, i.e. normal trucks, if you have a transferable job. So the transport industry was badly hit.

Can you share some technological advancements that have happened in the construction industry?

There is a huge transformation of digitalisation and electrification in the western world for everything. Not just the cars and vehicles, but also the tractors, stackers have turned electric.

All the port equipment, agricultural applications, material handling, and mobile crane applications will finally after some point in time be electric. You need a wheel; you need an axle to drive. So, no one will re-invent a wheel. They are only reinventing the power source. In an electric vehicle, you have two main things; one is your storage of power, which is the battery the other one is the axle and motor, to take power to drive the motor. So we are not into storage, we are into propulsion systems. Therefore, we provide an entire package, and our team in Germany deals with its entirety. And the company is investing heavily in this direction and we believe that we will play a major role in the electrified propulsion systems for off-highway machines in the future. However, for India, it is a long way to go.

What do you think about the quality of safety and level of technology in India especially in the construction and material handling Industry where is Kessler is the dominant player globally?

When it comes to standards of safety, India is in its infancy, the several constructions and material handling equipment are either not regulated or regulated through a century-old standard, which is phased out even in some developing countries. We need to understand that a lot is driven due to cost pressure. Non-implementation of the latest global standards is also a key reason for poor safety levels at active sites. Safety standards and technology need to be upgraded side by side and are a continuous process of evolution of any industry. Construction and material handling are no exception. As standards are not updated, the level of containerisation and palettisation is among the lowest in emerging markets, forget Industrialised countries. This is one of the main reasons why the total market size of warehousing equipment including forklifts is way behind that of China, Singapore, or even countries such as Thai-land and Malaysia.

How do you see your company's future in the next five years?

Our company works for the long term and five years are short term for us. We are exponentially multiplying our sales. We are not growing in percentages, mainly because of the huge variety of segments and the way the business is growing in this region. We see the multiplication of the applications. There is no chance that we are stabilising very soon.

We see the next 15-20 years to be very interesting for India. We are trying to scan India for our global sourcing model. Kessler is highly vertically integrated for non-proprietary components, but for proprietary items, we are trying to increase our dependency on India, because industrial GDP comes around 45-50 per cent from the automotive industry. India has a decent automotive supply chain setup. We want to leverage the model of ancillaries to use for our off-highway kind of requirement.

Machine Reliability: Concept, Reality And Remedy

Respective FMEA for each stage is conducted to assess how the risk is mitigated with the gradual implementation of best practices at the site.

The reliability of machines in any organisation is extremely important. About 90 per cent or more reliability is expected from relatively new machines. It is, therefore, pertinent to conduct periodic assessments of the performance and reliability of machines.

Failure mode and effect analysis (FMEA) is one such reliability improvement tool. It was developed in the 1950s and gradually fine-tuned with the advent of technology and software. Being a semi-quantitative method, FMEA is widely used to predict failures of components and reduce the risk of these failures.

FMEA can be broadly classified into two categories: Design FMEA (DFMEA) and Process FMEA (PFMEA). Lubrication FMEA belongs to PFMEA and we like to confine our discussion to lubrication (or lube) FMEA. We will not go into the detailed description of FMEA. Plenty of literature is available. [1-5] Interested readers may go through these articles to have a deeper understanding of FMEA.

Concept defined and described

Rolling element bearing (or roller bearing), one of the most critical components in any machine (mining, construction, cement, large gearbox system, etc.), is taken as an example. The most common causes of roller bearing failure are well documented in literature.[6] which is summarised in Table 1. We have considered the last four causes which contribute to 80 per cent of failure. Moreover, we have segregated 'contamination' into two parts: particle contamination and moisture/water contamination. Failures can be largely eliminated when these two contamination-related issues are properly addressed. As our present focus is on lube FMEA, lubrication-related failure modes are relevant, discussed elsewhere[7,8]. This is summarised in Table 2.

Next, we have conducted FMEA of the roller bearing system. It is essentially a process to estimate the risk the machines are currently operating with. This is the baseline 'as is' process and the results are appended in Table 3. Following assumptions have been made while conducting this assessment:

1. There is no consistent and documented training and awareness programme.
2. Control systems, like machine inspection, regular oil or vibration analysis, etc. either do not exist or are very poor in practice.
3. All maintenance activities, like replacement by new parts, storage, handling, and dispensing of fluids in the shop floor are carried out under open-air allowing contaminants to invade the systems.

These assumptions are very sensible and the facilities following these practices exist in reality across the globe.

Table 1: Common causes of bearing failure[6]

Sr No	Cause	% of failure
1	Material defect & manufacturing error	1
2	Indirect failure	4
3	Improper bearing mounting	5
4	Inadequate bearing selection	10
5	Insufficient bearing lubrication	15
6	Extended lubrication interval	20
7	Unsuitable or wrong lubrication	20
8	Lubricant contamination	25

Explanation of FMEA results

While conducting FMEA in Table 3, we have assigned [9] against severity. The severity will be always high because it's not possible for any facility to afford unscheduled downtime, production loss, and repair cost. Unlike Severity, Occurrence can vary depending on the type of failure mode. Detection would be on the higher



Table 2: Lubrication related failure modes[7,8]

		Friction control	Wear control	Corrosion control	Temperature control	Contamination control	Power & work transfer	
Lubrication failure mechanisms	Sudden volumetric loss						X	Put a cross where two coordinated intersect
	Low level	X	X		X			
	Wrong lubricant	X	X		X	X		
	Base oil degradation	X	X		X	X		
	Particle contamination		X		X	X		
	Moisture contamination			X		X		
	Fuel dilution	X	X		X	X		
	Coolant contamination	X	X	X	X	X		
	Additive depletion		X					
	Air entrainment			X		X	X	
	Foamimg					X	X	
	Under greasing/ over greasing	X	X		X			

Table 3: FMEA of roller bearing, as is process

Sr No	Process	Potential failure mode	Potential failure effect	Sever-ity	Potential causes	Occur-rence	Current process controls	Detec-tion	Risk Priority number	Recommended actions
1	Roller bearing in mining and construc-tion machines	Insufficient lubrication and wrong lubricant	Bearing damage & failure	9	Overly stressed lubricant leads tp lremature failure	6	very few, no tagging/ identification of lubricant barrels, tpp many unskilled manpower	8	432	Proper identifica-tion system, color coding, skilled workforce
2		Lack of lubrication or extended ODI	Bearing damage, failure and consequen-tial failures	9	Inadequate film thickness at bearing load zone, bearing wear and damage	6	Very few, only irregular inspection of oil level	9	486	Routine inspection, detection system
3		Excess lubrication	Bearing damage & failure	9	Rise in tempera-ture due to churning, viscosity drop	7	Nothing, there is always tendency of overgreasing	8	504	Calibration of grease gun, training
4		Particle contamina-tion	Lubrication failure, bearing damage & failure	9	three body abrasion, chain reaction of failures	9	No contamination practices, no best practices	9	729	Proper breathers, filters, seals, detection system
5		Moisture contamina-tion	Lubrication failure, bearing damage & failure	9	Oxidation, hydrolysis, acid formation, additive depletion, viscosity loss	9	No control to prevent water ingression	9	729	Proper breathers, filters, seals, detection system

Table 4: FMEA of roller bearing during stage 1

Sr No	Process	Potential failure mode	Potential failure effect	Severity	Potential causes	Occurrence	Current process controls	Detection	Risk Priority number	Recommended actions
1	Roller bearing in mining and construction machines	Insufficient lubrication and wrong lubricant	Bearing damage & failure	9	Overly stressed lubricant leads tp lremature failure	5	very few, no tagging/ identification of lubricant barrels, tpp many unskilled manpower	7	315	Proper identification system, color coding, skilled workforce
2		Lack of lubrication or extended ODI	Bearing damage, failure and consequential failures	9	Inadequate film thickness at bearing load zone, bearing wear and damage	5	Very few, only irregular inspection of oil level	7	315	Routine inspection, detection system
3		Excess lubrication	Bearing damage & failure	9	Rise in temperature due to churning, viscosity drop	7	Nothing, there is always tendency of overgreasing	7	441	Calibration of grease gun, training
4		Particle contamination	Lubrication failure, bearing damage & failure	9	three body abrasion, chain reaction of failures	8	No contamination practices, no best practices	9	648	Proper breathers, filters, seals, detection system
5		Moisture contamination	Lubrication failure, bearing damage & failure	9	Oxidation, hydrolysis, acid formation, additive depletion, viscosity loss	8	No control to prevent water ingression	9	648	Proper breathers, filters, seals, detection system

side (hard to detect), if there is no condition monitoring system in place. It is important to mention here that these numbers may vary but the team must be logically consistent to arrive at these numbers. Looking at Table 3 more closely, we find that RPN values for the first three failure modes are not very different. Excess lubrication (mostly in grease application) is a major problem in many facilities.

Grease guns are not calibrated and the maintenance team cannot tell the amount of grease delivered after a single-use. Both over greasing (excess lubrication) and under greasing (insufficient lubrication) pose threats to the rotating component. That's why its RPN value is higher than the other two failure modes. Contamination-related failure modes, on the other hand, are extremely dangerous. Contaminants silently invade the system and damage the critical parts. So, RPN values for particle and fluid contamination are highest and these failure modes are extremely costly.

Our next step is to understand when the organisation takes a major decision to get rid of the current practices and implement global best practices in its facilities. Accordingly, investment in terms of money and manpower would be approved. Now, it is interesting to watch what pain and problem the particular facility in the organisation has to come across to become a world-class facility. Three stages have been identified:

- Confusion and ego, especially, among the more experienced members in the maintenance team, irrespective of the number of training sessions the organisation holds for this purpose.
- Reluctant, however, accepts change, but still not ready to put adequate focus and sufficient efforts
- Finally, under strong leadership, all the members of the team are brought to the same platform. The team finally achieves its goal with intense efforts and laser-focused activity with a clear understanding.

Respective FMEA for each stage is conducted to assess how the risk is mitigated with the gradual implementation of best practices at the site. These are described in Table 4-6. Again, the figures related to RPN may be changed but in a logically consistent manner. Improvement patterns in various stages will remain the same even if the numbers are changed. The results are compiled and summarised in Table 7 and the



Table 5: FMEA of roller bearing during stage 2

Sr No	Process	Potential failure mode	Potential failure effect	Severity	Potential causes	Occurrence	Current process controls	Detection	Risk Priority number	Recommended actions implemented & sustained
1	Roller bearing in mining and construction machines	Insufficient lubrication and wrong lubricant	Bearing damage & failure	9	Overly stressed lubricant leads tp lremature failure	3	very few, no tagging/ identification of lubricant barrels, tpp many unskilled manpower	5	135	Proper identification system, color coding, skilled workforce
2		Lack of lubrication or extended ODI	Bearing damage, failure and consequential failures	9	Inadequate film thickness at bearing load zone, bearing wear and damage	4	Very few, only irregular inspection of oil level	4	144	Routine inspection, detection system
3		Excess lubrication	Bearing damage & failure	9	Rise in temperature due to churning, viscosity drop	6	Nothing, there is always tendency of overgreasing	5	270	Calibration of grease gun, training
4		Particle contamination	Lubrication failure, bearing damage & failure	9	three body abrasion, chain reaction of failures	6	No contamination practices, no best practices	6	324	Proper breathers, filters, seals, detection system
5		Moisture contamination	Lubrication failure, bearing damage & failure	9	Oxidation, hydrolysis, acid formation, additive depletion, viscosity loss	6	No control to prevent water ingression	7	378	Proper breathers, filters, seals, detection system

corresponding graphical presentation is shown in Figure 1. The timeline to achieve the goal (green curve in Figure 1) would be normally two to three years but it would depend on the preparedness of the core maintenance team even if strong support and cooperation are ensured from the top level of the organisation.

Reality and remedy

Now, it's time to leave the classroom and reach the ground reality. Let's go to any customer's site and assess the present conditions and work practices. On more than 95 per cent of the occasions we find the following practices:

- Dirty and contaminated workplace (poor housekeeping)
- Critical parts and components are not cleaned following proper procedure (visually dirty and oily surface) and left open to atmosphere providing the resting surface of airborne contaminants.
- Hoses and tubes are left open and unprotected.
- Oil barrels are not covered and stored under the sky allowing dirt and water accumulation on the top of the barrels.
- Handling, storage, and dispensing of fluids are practiced under open conditions. The same hand pump is used for all oils in the facility allowing cross-contamination.
- Cleanliness levels of fluids are never checked. Oil samples, sometimes, are sent to the nearest oil analysis lab but no benefits are reaped, no case study is generated.

This is the scenario in a typical site and that is a hard reality.

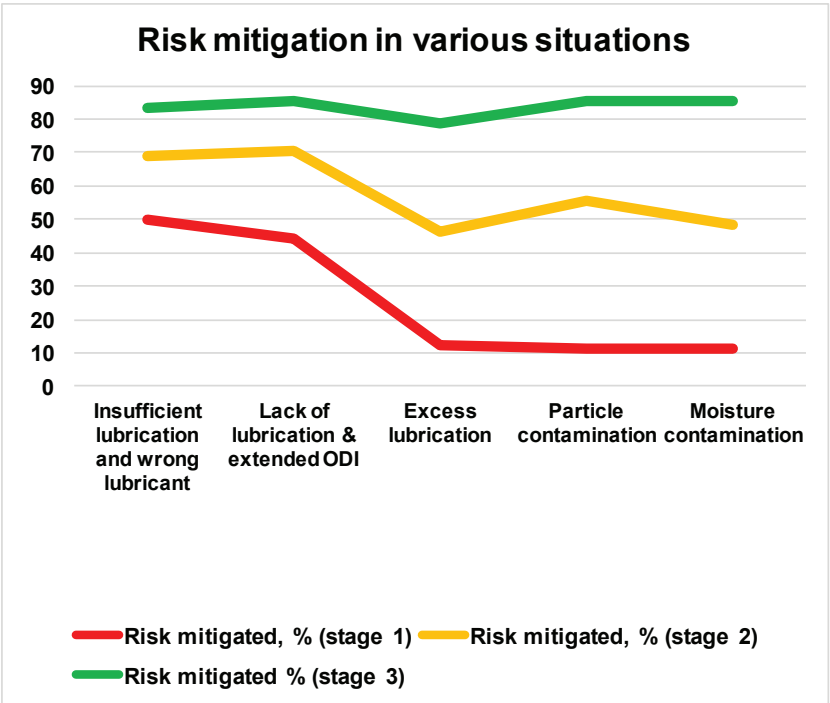
Site assessment, therefore, is necessary to understand the current conditions, to design and

> Failure mode and effect analysis (FMEA) is one such reliability improvement tool. It was developed in the 1950s and gradually fine-tuned with the advent of technology and software.

Table 6: FMEA of roller bearing during stage 3

Sr No	Process	Potential failure mode	Potential failure effect	Sever-ity	Potential causes	Occur-rence	Current process controls	Detec-tion	Risk Priority number	Recommended actions implemented & sustained
1	Roller bearing in mining and construc-tion machines	Insufficient lubrication and wrong lubricant	Bearing damage & failure	9	Overly stressed lubricant leads tp lremature failure	2	very few, no tagging/ identification of lubricant barrels, tpp many unskilled manpower	4	72	Proper identifica-tion system, color coding, skilled workforce
2		Lack of lubrication & extended ODI	Bearing damage, failure and consequen-tial failures	9	Inadequate film thickness at bearing load zone, bearing wear and damage	2	Very few, only irregular inspection of oil level	4	72	Routine inspection, detection system
3		Excess lubrication	Bearing damage & failure	9	Rise in tempera-ture due to churning, viscosity drop	3	Nothing, there is always tendency of overgreasing	4	108	Calibration of grease gun, training
4		Particle contamina-tion	Lubrication failure, bearing damage & failure	9	three body abrasion, chain reaction of failures	3	No contamination practices, no best practices	4	108	Proper breathers, filters, seals, detection system
5		Moisture contamina-tion	Lubrication failure, bearing damage & failure	9	Oxidation, hydrolysis, acid formation, additive depletion, viscosity loss	3	No control to prevent water ingression	4	108	Proper breathers, filters, seals, detection system

Figure 1: Continuous improvement with enhanced machine reliability



implement best practices that would help the maintenance team to mitigate the risk associated with the fluids as well as the machines. Continuous monitoring, periodic training and audit, continuous improvement, and sustaining the new culture are also very challenging and crucial to keep pace with this new culture transformation.

Items, accessories, tools required for process modification can be classified into two types - consumable items with low investment and Capex items with moderate to high investment. A brief list is given below:

- Consumable items – caps and plugs to protect hoses and tubes, shrink wrap to cover critical components, dedicated housekeeping team to maintain clean workplace,



Table 7: Risk mitigation summary

Potential failure mode	RPN (as is)	RPN (stage 1)	Risk mitigated, % (stage 1)	RPN (stage 2)	Risk mitigated, % (stage 2)	RPN (stage 3)	Risk mitigated % (stage 3)
Insufficient lubrication and wrong lubricant	432	216	50	135	69	72	83
Lack of lubrication & extended ODI	486	270	44	144	70	72	85
Excess lubrication	504	441	13	270	46	108	79
Particle contamination	729	648	11	324	56	108	85
Moisture contamination	729	648	11	378	48	108	85

oil barrel covers to protect the top of the barrel from water, moisture and airborne dust particles, proper type, and size of filters and breathers, quick connectors instead of threaded joints, hardware for oil sampling and associated accessories.

- Capex items – oil transfer pump, oil transfer containers to dispense oil under closed conditions, dedicated filtration equipment for all compartments, like, hydraulic, transmission, etc., particle counter to check cleanliness level of fluids, filter cutting and inspection facility, magnetic plug inspection and finally, a small on-site oil analysis lab to monitor most important parameters of the oil – viscosity, TAN/TBN, ferrous wear monitor, etc.

It is needless to say that the above list is not complete. The author just made an effort to give a general guideline. When these practices are implemented gradually and consistently, with proper records and documentation, the risk associated with fluids and assets can be significantly mitigated. Reliability and availability of machines would be enhanced, the number of failures, as well as the impact of failures, would be reduced.

Summary

Although FMEA is a pseudo-quantitative technique, it works well when applied seriously. All the members of the team must arrive at the same figures during the estimation of RPN. FMEA is a team activity and is consensus-based. This classroom concept can be turned into knowledge judiciously when the team applies it in the field. Process FMEA becomes necessary when the existing process needs to be modified with better detection systems. The ultimate goal is to mitigate the risk the machines are operating with.

That's why site assessment is of utmost importance. The risk of failures can be sufficiently reduced only when there is total control over the machines. The maintenance team, at any point in time, must be able to predict the condition of any machine with sufficient accuracy. Moreover, the team must attend to any minor problem in the machine before it turns into a major breakdown. This entire activity is essentially a transformation of culture. Achieving the goal is certainly difficult but sustaining it is even more challenging. It is a top-to-bottom approach. Strong and correct leadership from the senior management coupled with technically competent and dedicated maintenance team in the organisation can perform this seemingly impossible task.

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The article is authored by Dr Debasish Mukherjee, Sr Consultant at Gainwell Commsales.

DICV's Sustainability Goals

As an environmentally-conscious organisation, DICV is also moving forward along a roadmap that helps tackle climate change while spurring economic growth.

Daimler India Commercial Vehicles' (DICV) 'Seven Statements for Sustainability' is a series of goals aimed at reducing its carbon footprint and protecting the local environment. With the aim of making its Chennai plant operations 100 per cent CO_2 neutral by 2025, DICV leads the carbon neutrality commitment in the Indian CV industry. The initial set of goals is a part of DICV's long-term sustainability plan that will be unveiled in multiple phases, setting a new benchmark for the Indian auto industry.



Satyakam Arya, CEO and MD, DICV, said, "Driving sustainability in our production and operations has been a key focus for DICV since our inception. Our efforts so far have already helped us reach 72 per cent CO_2 neutrality in our plant, and we plan to push this to 100 dper cent by 2025. We will work continuously towards a sustainable future for our stakeholders and society as a whole."

At the Conference of Parties (COP26) in Glasgow, India pledged to increase its installed renewable energy capacity to 500 gigawatts and reduce carbon emissions by 1 billion tonne by 2030, as well as achieve 'net-zero emissions' by 2070. As an environmentally-conscious organisation, DICV is also moving forward along a roadmap that helps tackle climate change while spurring economic growth.

In the first phase of the roadmap unveiling, the company announced its goals for sustainability in operations, laying out initiatives planned for 2025 and beyond. DICV's 'Seven Statements for Sustainability' are as follows:

Statement 1: Make DICV operations 100 per cent CO_2 neutral by 2025 by...

- More than doubling the amount of captive solar power generated along with buying wind-based power and bagasse-based green cogeneration
- Changing all internal shuttles to electric vehicles

Statement 2: Aiming to make the entire value chain CO2 neutral by 2047 by...

- Conducting awareness campaigns for dealers/ suppliers and supporting them in this transition



Since the establishment of its manufacturing plant in Chennai, DICV has systematically implemented sustainability initiatives at every level.

- Sharing best practices and benchmarking KPIs for partners

Statement 3: Increase the green cover density of Chennai plant by at least 10% by 2025 by...

- Planting mini forests of native trees and increasing bio-diversity
- Planting an additional 2000 trees using organic farming methods

Statement 4: Reduce the energy consumption of production shop by at least 8% by 2025 by...

- Upgrading all lighting to LEDs
- Installing more efficient motors and using IoT devices to optimize usage of equipment like chillers and compressors

Statement 5: Reduce water consumption by 30 per cent, aiming for 100 per cent water self-reliance at the plant by 2025 by...

- Conserving use of water by smart flow metering arrangements
- Reusing effluent water generated from operations in paint shop manufacturing process

Statement 6: Continuously reduce waste generated from operations by...

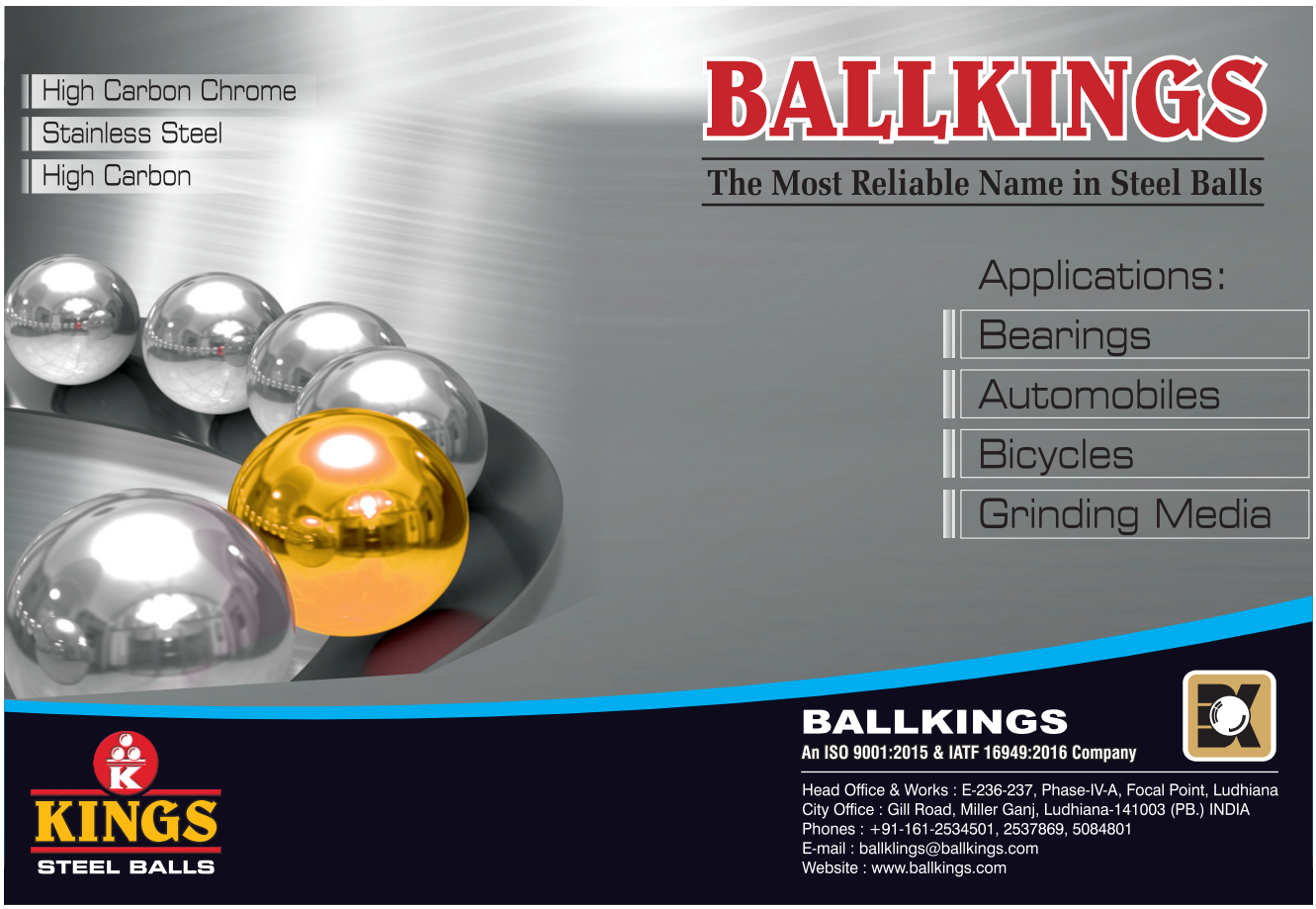
- Increasing usage of bio-degradable plastic in packaging process up to 50 per cent by 2025
- Using only biodegradable packaging material for all internal distributions (employee handouts, etc.)

Statement 7: Contribute to the betterment of nearby villages and societies

- Improving drinking water facilities and installing solar lighting in the community around Oragadam
- Educating children on environmental sustainability and facilitating health camps in nearby villages

Since the establishment of its manufacturing plant in Chennai, DICV has systematically implemented sustainability initiatives at every level. These include the installation of an energy-generation plant with over 10,000 polycrystalline solar power panels (compensates for around 3300 tonnes of CO_2 emissions/year) and a storage pond that holds more than 60,000 kilolitres. The plant itself is home to more than 17,000 trees and adheres to strict reuse/reduce/replace policies as part of its certification for ISO 14001 (Environmental Management Systems).

These measures contributed to the company winning the 'Best Energy Efficient Organisation' award from the Confederation of Indian Industry in this year's CII National Energy Efficiency Circle Competition.



The New Outcome-Focused World Of Manufacturing

The article outlines how smart, connected services can be used to drive efficiencies and provide insight to inform decision-making that ensures competitiveness while improving performance and profits.

Product coding and marking is a small but vital component of all manufacturing operations – an incorrect, or missing code can mean that products can't be shipped, which can put retailer performance targets at risk, damage brand reputation, and result in significant punitive fines.

Yet, it would be incorrect to say that manufacturers are overly focused on the specifics of their coding and marking equipment – or indeed, any individual piece of machinery on their production line. Today's manufacturers are more concerned by the bigger picture – in maximising uptime and ensuring that production lines can keep running no matter what.

With demand in manufacturing environments more unpredictable than ever before, the author outlines how smart, connected services can be used to drive efficiencies and provide insight to inform decision-making that ensures competitiveness while improving performance and profits.



Changing focus

Prior to the COVID-19 pandemic, manufacturers were already focused on the competitive advantage that could be achieved through integration, automation, and big data – including reduced costs and increased productivity.

Today, the technology and the benefits are the same, but the focus in recent months has been on adaptation; indeed, some might argue, survival. COVID-19 has accelerated a shift in the global manufacturing mindset; as traditional 'break and fix' approaches, which focus on the performance of individual technologies, are replaced by outcome-focused solutions, which emphasise the value in optimising the overall performance of a production line.

It's not hard to see the reason why – at times of unpredictable and unprecedented demand and high volatility machine failure can be disastrous, grinding production to a complete stop until a fix can be implemented. Solutions that optimise the overall performance of a production line can reduce the risks of machine failure, helping to keep lines running no matter what.

This change in mindset requires the provision of more information on the overall health of manufacturing systems. Is the line producing the optimal number of units, for example? Is the equipment indicating trends that are indicative of a higher failure rate? Any sudden change in production performance – or indeed gradual degradation – may indicate that something on the line is not performing as it should.

In response to the changing needs of manufacturers, the industry's forward-thinking hardware and software providers are now using data and insight enabled by Industry 4.0 principles to provide advanced services that limit unplanned production downtime, reduce waste, improve performance, and maximise profits.



Digitisation, sensorisation and optimisation

There has never been a better time to embrace new digital technologies to improve production line performance. As more and more providers begin realising the value in data acquisition to optimise performance and uptime, manufacturers can begin to take advantage of the technology, without necessitating a full-scale commitment to smart factory solutions.

In the coding and marking industry, for example, manufacturers can now use any number of Industry 4.0-enabled technologies, advanced software applications, and cloud-based solutions, to help improve production line efficiency and product labelling accuracy.

Coding automation software can minimise the risk of error and eliminate production downtime during product changeovers by networking printers, automating job selection, and populating data directly from a range of databases, and MES and ERP systems. Additionally, integrated vision systems can enable live 100 per cent monitoring of print quality – providing information on product throughput and product rejects.

The addition of sensors within Industry 4.0-enabled technology, when combined with cloud-based services, can allow manufacturers to monitor and measure variables that can have an impact on production and coding performance, such as temperature, moisture, air quality, motion, and vibration. This sensorisation can be taken a step further, to allow equipment to auto-detect problems by using algorithms to predict areas where issues may arise, allowing for early, planned intervention to mitigate the risk of unscheduled downtime.

Cloud-based services can also be used to provide remote intervention and assistance – by enabling service support staff to view how machinery is operating without conducting a site visit. Moreover, augmented reality applications can offer options for remote intervention, allowing external service support to 'see' with a customer's eyes exactly what is occurring on a line. Such solutions can speed up identification and resolution of issues with machinery: external service engineers can guide production workers to implement machinery fixes or carry out routine maintenance. And, where a site visit is required, they can arrive equipped with the necessary tools, materials, and knowledge to rectify the issue the first time.

Information from analytics can also be used by technology providers to alert manufacturers when their equipment may not be performing as it should be and allow for intervention before a line fails. If the line in question is a critical line, for example, the manufacturer can help production planning and supply chain management by gearing up an alternative line without impacting overall performance.

The increased digitisation and sensorisation of production lines create a treasure trove of data that can be used to optimise operations and further increase production line efficiency. This is where cloud-enabled solutions – including live reporting – present the opportunity for technology providers to move from the traditional, reactive 'break and fix' approach to the proactive and adaptive model forward-thinking manufacturers demand.

In the future, it's likely that artificial intelligence and machine learning capabilities will enable manufacturers to identify further areas of productivity improvement through in-depth analysis of historical and real-time data, scenario planning, and cost model simulation.

Sustainability drivers

Manufacturers' most pressing priority in recent months has been survival. That said, it is clear that the ability to react and adapt – in near real-time – to any slight change in production performance will enable manufacturers to remain operational, productive, and efficient, in the face of any volatile or unpredictable scenario.

Going forward, the wealth of data afforded by Industry 4.0 and connected services will enable manufacturers to determine exactly when and why intervention is needed, and how to implement this, in order to keep their production lines running with minimal disruption.

Equally, as the world adjusts to the 'new normal', brought about by COVID-19, it is likely that former concerns relating to sustainability will be reinvigorated. As such, having the technology, data, and insight to maximise efficiency, and reduce waste, across any production line, at any time, is now, arguably, more important than ever.

Embracing an outcome-focused approach to manufacturing is not something that can be achieved in isolation. Such an approach demands collaboration and the coming together of hardware and software providers to unlock the insight from Industry 4.0-enabled technologies, advanced software applications, and cloud-based services to create and design new outcome-focused solutions. No two manufacturers are the same, and so, in an outcome-focused services world, no two solutions will be the same either. Forward-thinking equipment providers will facilitate this shift, by becoming service suppliers and tailoring their solutions to the outcomes required by specific manufacturers.

About the Author:
The article is authored by Andy Barrett of Domino Printing Sciences.

Vögele Mobile Power Feeder Increasing Footprints In India

Since 2006, the VÖGELE mobile power feeders, are in use in various national highway projects in Haryana, Rajasthan, Uttar Pradesh, and Gujarat.

India has the second-largest road network in the world, spanning a total of 6.39 million km as per Economic Survey 2021. This road network transports 64.5 per cent of all goods in the country and 90 per cent of India's total passenger traffic uses the road network to commute.

The National Infrastructure Pipeline of which Bharatmala Pariyojna is a part has also accelerated the construction of several Greenfield projects including the expressways and mega highways. With such humongous ongoing and targeted construction of road infrastructure in the country, it becomes more pertinent for the use of state of the art -innovative technologies for cost optimisation and quality results.

VÖGELE mobile power feeder offers cutting-edge technology that sets standards in modern road construction both in terms of quality and economic efficiency. This mobile feeder not only continues to gain popularity for use in large highway projects but has also exponentially contributed to delivering excellent paving results.

Since 2006, the VÖGELE mobile power feeders, are in use in various national highway projects in Haryana, Rajasthan, Uttar Pradesh, and Gujarat.

Job Site: Delhi – Mumbai Expressway

The 1350-km Delhi-Mumbai Expressway (DME) project (NH-148N / NE-4) is an under-construction eight-lane access-controlled road with a route connecting DND in Delhi with JNPT in Mumbai. It has been designed with a speed limit of 120 km/hour and provision to expand to 12 lanes in the future.

This new greenfield expressway was approved for construction under the Bharatmala Pariyojana programme in 2017. This being a mega greenfield project is one of the ideal project sites for use of mobile feeder although the following prerequisite was checked/ensured before the machine was physically moved to the job site.

1. Total quantity of asphalt to be paved
2. Current paving methodology for eight-lane carriageways of 18.75 m width
3. Batch (hot mix) plant capacity





4. Availability of the paving front or length
5. Per day paving target (quantity and length)
6. Average lead of the paving site from plant location
7. Availability and type of trucks used in asphalt mix transport

It was more interesting to have this job site because the opportunity was to use a mobile feeder on one unit of Vogele asphalt paver S1800-3, which is working in echelon form with another paver and also to use feeder on both the machine.

The paving process was carried out with AB 600-3 TV screeds paving 18.75 m width of SMA in a single pass. MT 3000-2 power feeder was used for continuous and jerk-free feeding.

Post completion of approximately 9.14 km of paving length and 10,000 tonnes of material paved construction company site team from the quality check and mechanical reported the following:

- Continous and more homogenous supply of mix – Uninterrupted paving and avoid feeding of segregated material to the paver hopper
- Jerk-free paving operation because of contactless paving

Table 1:

Project Name:	Package 5 & 6 of Delhi – Mumbai Expressway
Location:	Dausa (Rajasthan)
Pavement:	Stone Mastic Asphalt (SMA) Width:- 18.75m Layer thickness:- 50mm compacted

- Eliminating the chances of having cold and hot spots in the paving mat, thus eliminating compaction variance
- Increase in onboard material capacity
- Higher productivity
- Reduction in the number of paving stops

The outcome was excellent ride quality, surface finish, and less manpower requirement during paving, thereby reducing the chances of error due to human intervention in the paving process.

There is no direct contact between tippers/ lorries and the pavers, which eliminates the jerk transfer from tippers to the pavers diminishes the chances of bump formation on the mat. Non-contact and continuous paving make the pavement completely undulation free. Homogeneous material being supplied by the conical augers ensures uniform temperature mix being supplied to the paver which eliminates chances of thermal segregation throughout the mat. Two infrared heaters present on the conveyor ensure no materials stick to the conveyor belt which improves the life of the conveyor.

Power feeders are perfectly suited for hot-to-hot paving in which two pavers work side by side paving large width in a single pass with the elimination of longitudinal joint. Paving multiple lanes side-by-side (with adjacent pavers slightly offset) can remove the longitudinal joint between pavers because both mats are hot when initially compacted. Rollers behind the echelon pavers can pass directly over the longitudinal joint while both sides are hot, which results in better compaction.



As per user feedback, "undulation in the paved layer by power feeder has been reduced significantly. Surface quality improvement is the utmost advantage of power feeder."

Unique features of VÖGELE MT 3000-2 offset power feeder are:

- Uninterrupted paving due to a total storage capacity of 45 t with a maximum conveying capacity of 1,200 tph
- Non-contacting material transfer makes for enhanced pavement quality.
- Homogenised mix in the receiving hopper of the material feeder due to conical augers
- Wide range of applications due to the pivoting and inclining conveyor
- Reliable material transfer based on automatic distance control and anti-collision protection
- Powered with Deutz Engine with 142 kW at 2000 rpm supplemented with ECO mode 139 kW at 1800 rpm
- Conveyor pivoting angle range of ±55 degrees with two infrared heating panels
- Optimum visibility and safety due to the convenient and practical ErgoPlus operating concept.
- Ergoplus operating console offering upgraded ergonomics, safety, and visibility.

Table 2: Equipment used

Power feeder	1 Vogele MT3000-2
Paver	2 Vogele Super 1800-3 with AB600-3TV Screed
Tandem rollers	4 Hamm HD99 tandem rollers
PTR	2 Hamm GRW 15

A new generation of material feeders from VÖGELE

They guarantee constant, smooth transfer of material and now offer paving teams numerous practical new features: the MT 3000-3 Standard and MT 3000-3 Offset PowerFeeders from world market leader VÖGELE integrate the latest Dash-3 machine concept and an optimised conveying and maintenance system.

ErgoPlus 3, Autosetplus, and PaveDock Assistant are some of the key features which enhance the ergonomics and ease of operation of the Vogele power feeder.

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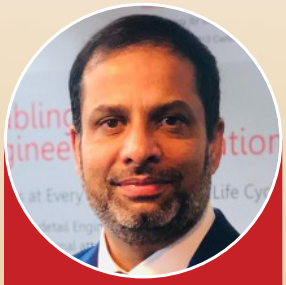
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HIGHLIGHTS

- Product Innovations in 2021
- Featuring more than 350 latest engineering products giving complete details of their benefits and applications
- Interviews of Industry Thought Leaders

TOPICS TO BE COVERED:

- Tracking the journey of India in the last 50 years
- Road ahead for the Indian manufacturing sector
- What it means to be Aatmanirbhar
- Opportunities for India in volatile and uncertain global marketplace
- Upgrading manufacturing processes & technologies for sustainable growth
- Need for skill development to build a future-ready workforce

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Kubota's new compact tractors get premium features

With the introduction of two new tractors to the company's legacy L Series compact tractors, Kubota brings many of the hydraulic enhancements and features of premium machines to a new generation.

The Kubota L3302 and L3902 four-wheel-drive models are available with either gear drive or hydrostatic transmissions. The hydrostatic transmission provides fast travel speeds and forward/reverse control that can be operated simply by pressing down on the floor pedal. The hydrostatic models also offer an independent PTO that's engaged with the flip of a switch. Alternatively, the gear-drive transmission provides a wide range of pulling torque and tractive effort with eight forward and eight reverse speeds.

The "L02" series offers two horsepower options, 33 and 37.5 horsepower on the L3302 and L3902, respectively. The engines are equipped with fuel-efficient common-rail, electronically controlled fuel injection. This together with large fuel tanks means the tractors can work longer without the need to stop and refuel as frequently. Additionally, the common-rail system reduces noise and vibration for a better operator experience.

The new machines have been designed to include premium tractor features such as a more spacious operator station, standard rubber floor mats and an improved suspension seat with optional armrests. A sharp curve to the hood



gives the tractors a more modern look, and standard LED headlights and side work lights improve illumination when you're trying to finish a job at night or in low-light conditions

Designed specifically for the L3302 and L3902, the deeper performance-matched front loader bucket has a maximum lift capacity of 1,144 pounds at the pin and a maximum lift height of 94 inches. The loader valve gives you simultaneous boom and bucket operation and a regenerative circuit to increase speed and dump times to maximizing productivity. The bucket can quickly and easily be removed from the tractor without tools or additional kits.

JLG boosts capacity on new hydraulic RS2646 scissor lifts



JLG has two new scissor lift models, the electric-drive ES2646 and the hydraulic-drive R2646, with a 20 per cent increase in capacity. Both are rated for indoor and outdoor use and have a platform height of 26 feet and capacity of 1,200 pounds.

The models share a common chassis and platform, offering 32 feet of working height and the ability to carry two occupants to height indoors and one occupant to height outdoors.

With electric drive, integrated components, and limited hydraulic parts on the ES2646, there is a reduced chance for leaks and service calls, the company says. The model is available with an optional CleanGuard leak-containment system for work on sensitive flooring.

The R2646 is equipped with active pothole protection, which provides increased ground clearance when working on demanding terrain.

"With a wide variety of jobs to be done, the

20 per cent increase in capacity of the ES and R2646 models, as compared to competitive models in the size class, allows scissor lift operators to carry more materials, like pipes and panels, as well as tools such as welders, to the work area," says Bob Begley, director of product management for JLG scissor lifts, vertical lifts, and low-level access lifts. "This means that overhead tasks can be completed quicker and more efficiently."

These new scissor lifts also share common technologies, such as variable tilt to increase the work envelope during use on uneven surfaces, and they can accommodate a variety of options and accessories, including JLG Mobile Control, QuikAccess Rails and QuikFold Rails.

Kobelco packs large excavator features in new 5-t KS45SRX-7

Kobelco just entered the arena with a new model, its next-generation KS45SRX-7. Created with all the attributes of Kobelco's Performance X Design concept, the new machine offers the same quality, feel, and comfort as the company's larger excavator models.

The SK45SRX-7 weighs 10,030 pounds with canopy and 10,300 pounds with cab. Get up and go is provided by a 37-horsepower Yanmar diesel engine. With the standard arm you can reach a maximum height of 18 feet 10 inches. Max reach at ground level is 18 feet 8 inches. And digging depth goes to 11 feet 3 inches.

All this comes in a package that is just 6 feet 5 inches wide with a compact tail swing for operation in restricted spaces, such as urban or residential jobsites. The standard arm is 5 feet 1 inch and comes with a preinstalled thumb bracket.



More powerful hydraulics

Kobelco boosted hydraulic performance on the SK45SRX-7 to make it faster and more productive compared to the previous 6E series.

The new hydraulic system shortens the digging cycle time by up to 7 per cent without reducing speed, even with a heavy load or when traveling up a slope. Redesigned travel motors increase the travel speed by up to 5 per cent.

Additional hydraulic benefits include smoother operation and improved leveling performance. The integrated-flow pump system enables operators to harness extra output from the third pump, which otherwise powers the swing and dozer circuit. This additional output is directed to the arm and boom for added power when digging, resulting in a fast and smooth raising operation, even under heavy loads.

'One-pass' blade

When it comes time to level out your site, a two-way dozer blade with float comes standard. A common feature on the Performance X Design series, the blade contour ensures the soil falls forward rather than behind the blade when dozing. Typically only one pass is needed to clean up the site.

A four-way (power angle) dozer blade with float is also available as an option. When in Energy Conservation mode, the SK45SRX-7 adapts S-mode to enable 26 per cent less fuel consumption when compared with H-mode, and an auto-deceleration switch is installed as standard.

Stronger steel

The structure of the SK4SRX-7 has been reinforced with large cross-section segments across the boom, arm and swing bracket. Bolt-tightened pins firmly lock the boom to prevent the boom top from opening laterally.

The bucket features a cast-iron idler link, and the box construction dozer supports provide greater strength. The high-strength cab/canopy meets ROPS, TOPS, and OPG Level 1 (top guard) standards.

Historic tower crane returns to Liebherr

The Liebherr Tower Crane Center in Bad Waldsee boasts a new attraction: a Form 30A/35 tower crane, built-in 1969. The crane's owner, Stephan Keim, loaned it to Liebherr at the beginning of January. The Liebherr fan had discovered the crane in 2008 and saved it from being scrapped. He worked for years to return it to its original functional state.

A 350-km trip back home

Before the crane could be assembled at Liebherr, it was disassembled and transported from Aschaffenburg to Bad Waldsee on two lorries, a 350-km journey. On-site, Stephan Keim and a team of Liebherr mechanics reassembled the crane within two days. Visitors can now admire the crane as an industrial monument at the Tower Crane Centre site. "We're excited that this part of Liebherr history has returned to us. Over the years, many historical construction machines have been taken out of service and scrapped. It's important to us to preserve our history and Stephan Keim has made an important contribution to that," says Michael Goll, Head of Global Communication & Organizational Development at Liebherr-Werk Biberach GmbH.

Restoring a legend

It took over four years to breathe new life into the Form 30A/35 – from its discovery to the finishing touches. The restoration alone took about a year to complete: "The crane was dilapidated when I acquired it," says Stephan Keim. The account manager hadn't restored a machine of that size until then. The crane, constructed in July 1969, was completely rusty and many of its components were badly damaged or broken. "Changing the screws of the ring gear alone took a whole day. They are very difficult to reach." The bolts, too, were rusty and beyond use, however, they were of good substance. They were polished, galvanised and reused wherever it was possible. The whole crane was sandblasted and repainted. Stephan Keim changed every single screw. Furthermore, the rope pulley bearing and restored the control cabinet as well as the ropes and wiring.

A new start with original and spare parts

Overall, the tinkerer was able to buy and include numerous original and spare parts that Liebherr still has in stock. Liebherr also provided 120 litres of the original yellow varnish. "But the driver's cabin posed a big challenge. It had rusted



completely, and the metal sheets were full of holes. It was beyond repair," says Stephan Keim. Supported by his locksmith, he replicated the metal sheets, accurate to the millimetre, so that they were indistinguishable from the original. Today, the crane has a UVV (accident prevention regulation) test badge and is once again fully operational.

Indispensable from construction sites of the 70s

The Liebherr Form 30A/35 was produced from 1962 until the mid-seventies. It was one of the most widely built medium-sized cranes of its time. Liebherr constructed around 3,000 models. Erecting cranes with needle jibs were the common models at the time. Until, in the mid-seventies, a new, fully modified type of cranes entered the market. They were easier to transport and more cost-efficient than the models that were common at the time. Although it gradually vanished from construction sites, the Form 30A/35 marked the beginning of a new era in crane construction: it was the first of its kind constructed with tubular and hollow profiles instead of the previously used L-profiles. In a modernized form, this construction method is still being used in all Liebherr tower cranes today.

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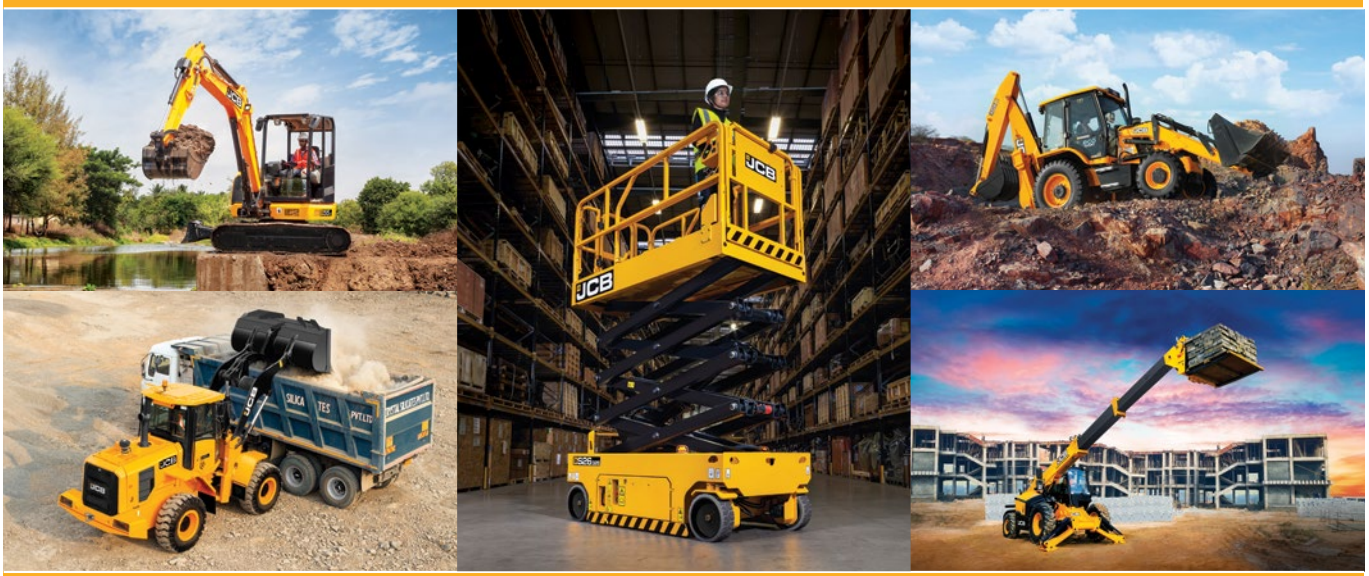
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Founder & Executive Director
Email: Info@FIRSTConstructionCouncil.com
Tel: +91-22-24193079

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