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16th ANNIVERSARY

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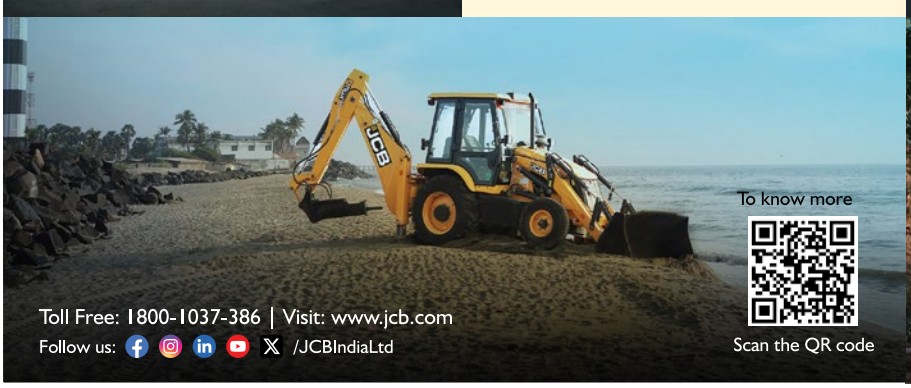

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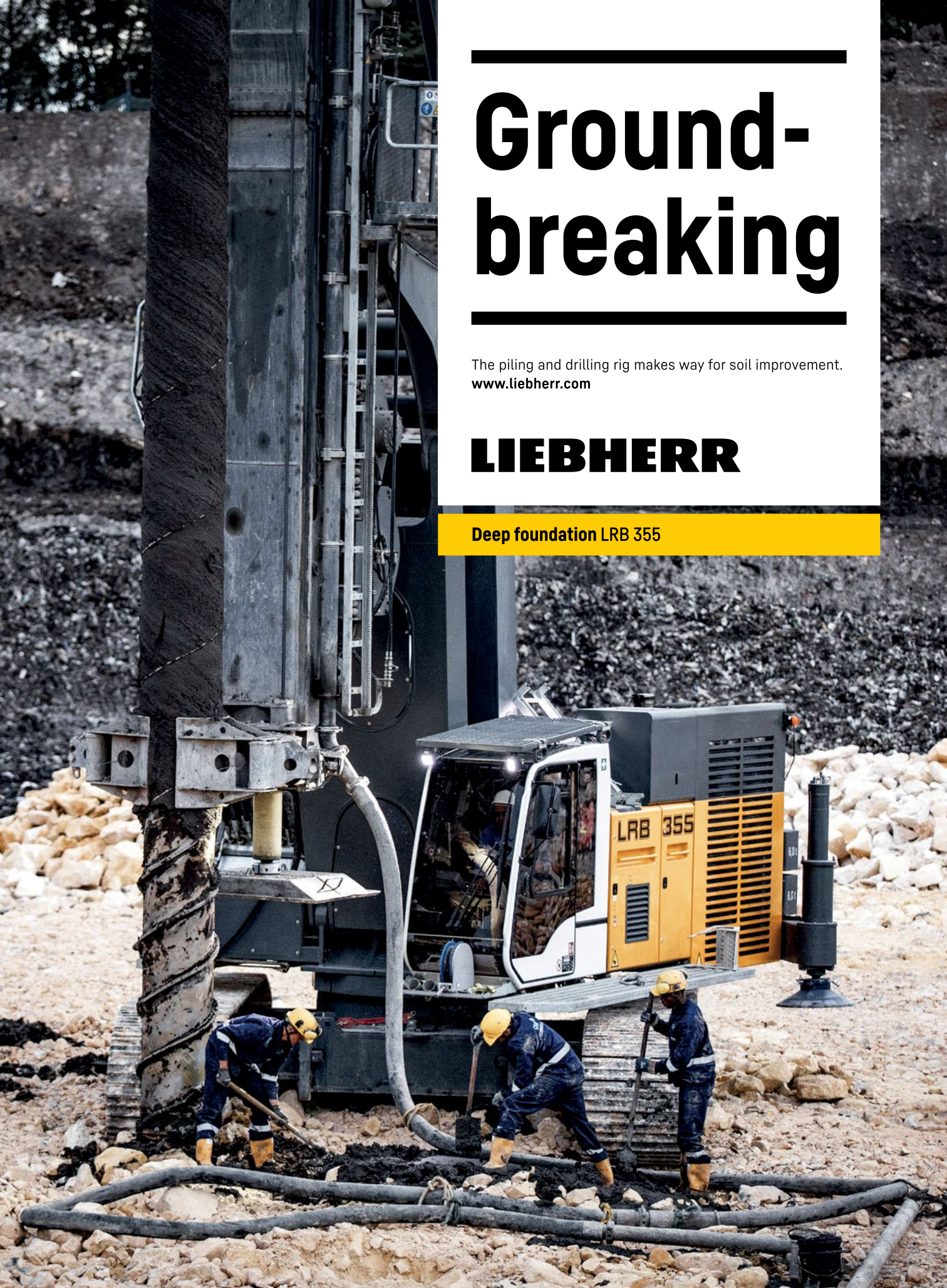

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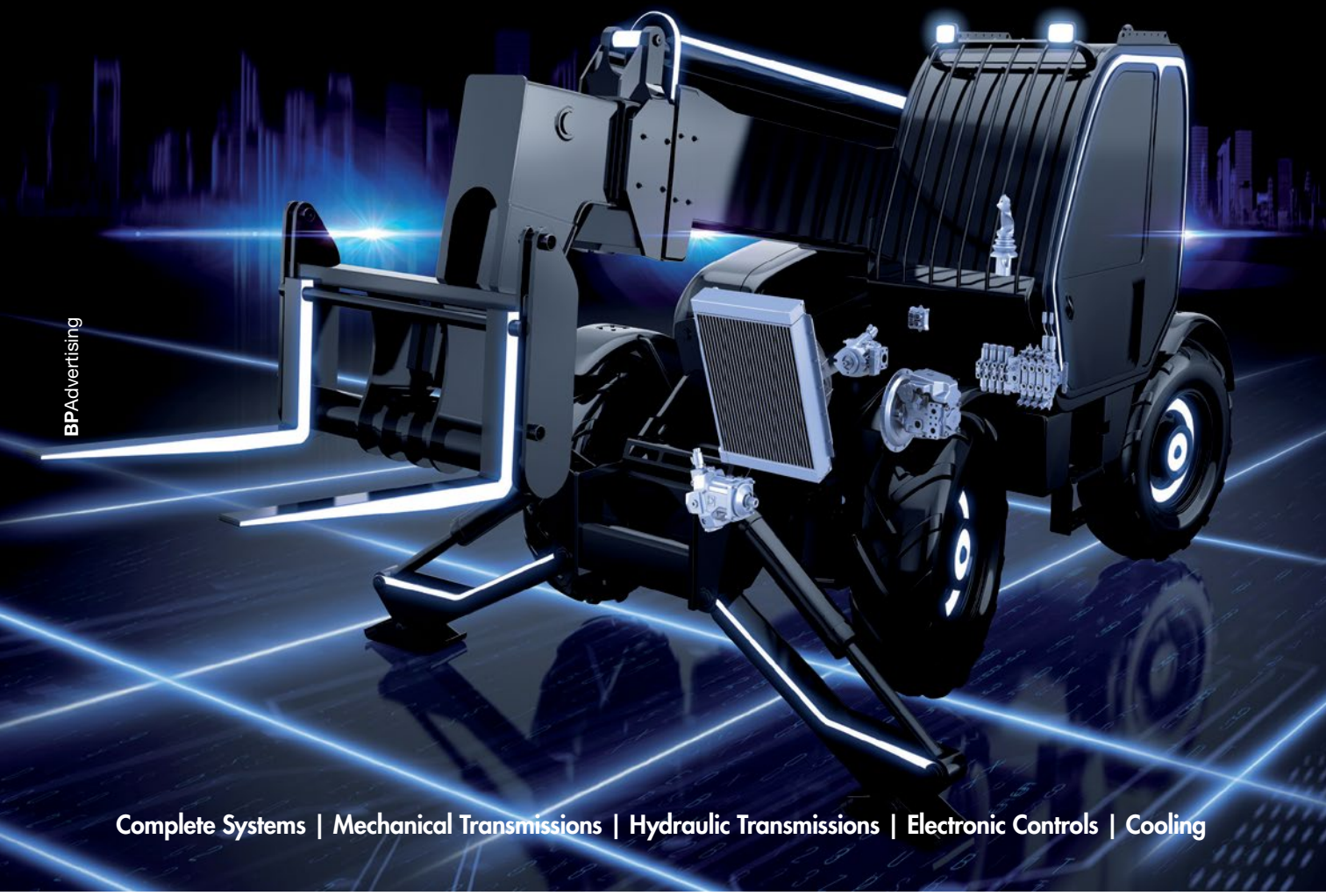

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IS THE CE INDUSTRY FUTURE-READY?

The dawn of a robotic era is upon us. For decades, industrial robots have been a staple in manufacturing, and now they're penetrating every facet of our lives. The construction sector stands on the cusp of an automation revolution. But is the construction equipment (CE) industry prepared for the future?

The vision of autonomous machines driving and working independently looms large in the construction industry's future landscape. While major original equipment manufacturers (OEMs) from around the world have initiated experiments with fully autonomous heavy-duty machinery on construction sites some years back, the concept has yet to transcend the prototype phase or achieve widespread availability. Surprisingly, many prominent OEMs have opted not to contribute to this edition, citing a lack of interest in Artificial Intelligence (AI) and Machine Learning (ML). It is the traditional mindset which eludes the potential of the future. AI and ML are not ready prototypes but the platform for applications. The applications are only limited by our own imagination. Having said that, I must also add that on one hand India has this rigid L1 mindset and on the other a craving for the radical.

That said, implementing automation and AI on a large scale poses significant challenges, and the utilisation of AI remains restricted to select applications. Nonetheless, gradual shifts are occurring, and the construction sector is progressively embracing AI-enabled construction equipment, which not only addresses concerns regarding health and safety but also enhances productivity on site.

In the 16th Annual Edition of EQUIPMENT INDIA, we embark on a journey into the forefront of AI and ML and explore their transformative influence on the CE industry.

The CE sector in India experienced a remarkable upsurge, witnessing a 30 per cent increase in sales, totaling 36,055 units during the third quarter of the current fiscal year. This surge, as per data from the Indian Construction Equipment Manufacturers Association (ICEMA), contrasts with the 27,817 units sold during the same quarter in the previous fiscal year.

Breaking down the numbers, sales of material handling equipment soared by an impressive 46 per cent, reaching 4,482 units, while concrete equipment sales surged by 43 per cent, totaling 3,840 units for the period. Moreover, sales of road construction and material processing equipment saw increases to 1,958 and 688 units, respectively, marking rises of 38 per cent and 18 per cent.

In 2023, Caterpillar's construction industry segment contributed nearly 41 per cent of external revenue, amounting to Rs 27.4 billion. Komatsu reported a robust performance in the third quarter, with significant increases in net sales and income. The company saw a 5.6 per cent rise in net sales to Rs 972 billion, a 15.9 per cent increase in operating income to Rs 156.4 billion, and a 42.4 per cent surge in net income to Rs 98.7 billion year-over-year.

Despite facing a weaker market landscape across several regions globally, Volvo CE achieved an increase in annual net sales from 2022, though experiencing a drop in sales for the last quarter. Global net sales decreased by 4 per cent to Rs 26,578 million, with machine sales decreasing by 6 per cent and service sales increasing by 6 per cent.

Schwing Stetter India witnessed revenue exceeding Rs 5,000 crore in 2023, driven by strong double-digit growth, representing a 35 per cent surge year-over-year. Action Construction Equipment also saw a notable increase in revenue, rising by 35.4 per cent year-over-year (11.9 per cent quarter-over-quarter) to Rs 753.1 crore, primarily propelled by robust growth in cranes and CE segments.

Expectations point towards double-digit growth in the sale of construction equipment for the second consecutive year in this fiscal year, buoyed by significant government spending on infrastructure development. Anticipations are high for the CE sector to maintain its momentum in the fourth quarter, ensuring a robust conclusion to the financial year 2023-2024.

In the automobile components sector, ICRA projects a 9 to 11 per cent growth for its sample of 45 auto ancillaries in FY2024, driven by healthy domestic demand despite a high base and moderate growth in exports. However, for FY2025, growth is anticipated to be relatively lower at 5 to 7 per cent, with expectations of moderated domestic volume growth and a weak outlook for exports.

Nevertheless, factors such as increased supplies to new platforms due to vendor diversification initiatives by global OEMs, higher value addition, and aftermarket demand potential in overseas markets augur well for Indian auto component suppliers. Over the medium to long term, opportunities in electric vehicles (EVs), premiumisation of vehicles, focus on localisation, and changes in regulatory norms are expected to support stable growth for auto component suppliers.

In the first half of 2023-24 (April-September 2023), the automobile components industry witnessed a turnover growth of 12.6 per cent to $36.1 billion (Rs 2.98 lakh crore), compared to $33.9 billion (Rs 2.65 lakh crore) earned in the corresponding period of FY23.

ZF inaugurated its latest manufacturing plant close to Chennai, specifically designed for the production of auto-components and systems tailored for electric vehicles. This establishment signifies ZF's 19th production unit in India and its 10th in Tamil Nadu. Given that Tamil Nadu's auto-components industry already contributes 35 per cent to India's overall production, the addition of this new facility is anticipated to enhance the sector even further.

Sona BLW Precision Forgings, known as Sona Comstar, has achieved certification under the auto production-linked incentive (PLI) scheme, marking its inaugural product under the PLI scheme and becoming the first automotive component entity to attain this certification.

With a budgetary allocation of Rs 25,900 crore over five years, starting in FY24, the PLI scheme underscores the government's commitment to strengthening the auto and auto component sectors in India.

All eyes will be on the upcoming election this year!

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CASE extends presence in Rajasthan

CASE Construction Equipment, a brand of CNH, has broadened its presence in Rajasthan by appointing a new dealer partner, RDR Techsol in Jaipur. Located at Patel Nagar, Ajmer Road, the dealership will offer CASE's wide range of products in India and provide comprehensive support for after sales service and spare parts. The strategically chosen location will provide services to surrounding regions, including Sikar, Ajmer, Dausa, Alwar, Bharatpur, Karauli, and Dholpur in the state of Rajasthan.

This cutting-edge facility will be offering the comprehensive range of construction equipment from CASE and provide a holistic customer experience. It will cater to the customers' need with facility such as a fully equipped workshop, a training/conference room, genuine parts availability, a team of trained service engineers, and an upcoming telematics centre along with a customer lounge.

A global leader in Construction Equipment since 1842, CASE has been present in India since 1989. It has consistently remained a market leader in the Vibratory Compactor segment and a leading player in the backhoe loader segment, since inception. The company produces Made-in-India products in its state-of-the-art manufacturing facility in Pithampur, Madhya Pradesh for the domestic and export markets in over 105 countries.

BharatBenz inaugurates new dealership in Indore

Daimler India Commercial Vehicles (DICV), the wholly owned subsidiary of Daimler Truck AG has added a new 3S (Sales, Service and Spares) BharatBenz dealership to its network in Indore, Madhya Pradesh, partnering with PPS Trucking. This facility is the 17 BharatBenz sales and service location in the state; the other 16 locations are situated in Indore (Rau), Bhopal, Jabalpur, Bela, Katni, Shivpuri, Singrauli, Chattarpur, Sagar, Manawar and Gwalior. The 3S dealer network is complemented by six 2S (Service and Spares) and four 1S (Spares) facilities in the state, which are smartly located to meet the varied demands of customers throughout the region. Spread over 51,000 sq ft, the new PPS Trucking BharatBenz dealership in Indore is the 17th sales and service facility in Madhya Pradesh. The service network in Madhya Pradesh comprises of 15 Mobile Service Vans (MRVs) and 49 service bays, capable of servicing up to 24,000 vehicles annually. This extensive network ensures timely and efficient service delivery to customers, enhancing their ownership experience.

DICV's plan in Madhya Pradesh is not only to expand its sales and service network but also to educate dealer and service staff about the unique needs of customers and how to provide them with unparalleled service quality. This approach is mirrored in the company's nationwide initiative to skill 8,000 service technicians who would be trained to service over 6 lakh vehicles annually.

BharatBenz has the reputation of being one of the most respected truck brands in the Indian commercial vehicle industry since its inception and is known for its stellar engineering, safe vehicles and uptime assurance.

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SANY participates at Odisha Buildcon

SANY India, a leading manufacturer of construction equipment, has made a significant impact at the Odisha Buildcon International Expo in Bhubaneshwar. Held from February 15 to 18 at Baramunda Ground, Bhubaneshwar, the event saw SANY India unveiling its latest range of innovative construction equipment, underscoring its dedication to being the catalyst for 'Naye Bharat Ka Nirmata', and strengthening its role as a key contributor to India's infrastructure growth.

At the SANY India stall, visitors saw the opportunity to explore state-of-the-art models, including the SY215C-9 SPARC Excavator, SY140 excavator, SY80C Excavator, and STC500 Truck Crane. These cutting-edge machines epitomise SANY's commitment to delivering high-performance, reliable, and technologically advanced solutions to the construction industry. The SY215C-9 SPARC Excavator exemplifies SANY's engineering prowess, delivering unmatched efficiency, durability, and precision. Equipped with an advanced hydraulic system and intelligent control technology, it effortlessly handles demanding excavation tasks, maximising productivity on-site.

LAPP launches first compounding plant in Bhopal

LAPP India inaugurated its first-ever compounding plant within the entire LAPP Group. This state-of-the-art facility signifies a leap towards backward integration. The plant enables large-scale manufacturing of proprietary formulations developed by the 'Compounding Plant Braintrust' – a team of experts from LAPP Korea, LAPP Switzerland, LAPP Germany, and LAPP USA dedicated to crafting specialised compounds for diverse cable applications.

Bridgestone India appoints Hiroshi Yoshizane as MD

Bridgestone India, part of the Bridgestone Corporation, a global leader in tyres and sustainable mobility solutions, announced Hiroshi Yoshizane will take over as its new managing director. He will succeed Stefano Sanchini, who will be moving into the role of VP Consumer Replacement for Europe. Yoshizane moves to his new role from Bridgestone Japan where he has served various leadership positions. He last served as Executive Vice President of Solution Business, Retail & Service Business in Bridgestone Tire Solution Japan. This development follows Bridgestone Corporation's recent announcement regarding global reorganisation of Bridgestone East and West. India will be reassigned under East forming BSAPIC as one SBU – Asia Pacific, India & China, considering that these geographies represent similar consumer sentiments and Bridgestone's synergies can be channelised to develop these markets further.

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IndianOil Skytanking boosts airport fleet safety with Netradyne

Netradyne, a Make-in-India provider of AI technology, announces its collaboration with IndianOil Skytanking, India's foremost aviation fuel management and airline fueling service provider. As a part of the engagement, Netradyne will provide its flagship platform, Driver•i, the industry's most advanced fleet safety camera platform that uses vision-based technologies to enhance driver safety, mitigate risks, and improve overall fleet management at airports across India.

Operating fuel-management and refueling services for airlines in high-activity environments, such as airports, brings a unique set of challenges and risks where precision and safety are paramount. IOSL, with its rich legacy and commitment to excellence, has been instrumental in shaping the aviation fueling landscape in India. This partnership with Netradyne reinforces their commitment to innovation and safety.

Goa mining resumes: Economic boost as operations to restart

Authorities have given the green light to resume mining operations in Goa marking a crucial step towards reviving the state's mining sector. The decision comes after a prolonged hiatus offering a ray of hope for the local economy. With environmental concerns addressed and regulatory frameworks in place the mining industry is poised for a restart. This move holds immense promise for Goa's economic landscape injecting vitality into a sector.

Tata Hitachi launches EX 210LC Prime

Crafting the Future of Excavation - Building on a legacy of reliability and performance, the new advanced EX 210LC Prime inherits a strong lineage from its predecessors. With a history of proven durability and efficiency, this upgraded machine continues to uphold Tata Hitachi's commitment to delivering high-quality construction equipment. The legacy of the EX 210LC series lays the foundation for the Prime's reputation as a dependable and innovative solution for diverse construction needs.

The launch took place at Peerless Inn City Centre, Durgapur, in presence of esteemed customers,

senior management of Tata Hitachi and Mitra Commercial & Automobiles LLP (Authorised Dealer Partner). With higher fuel efficiency, lower maintenance cost and higher re-sale value, the all-new EX 210LC Prime promises highest return on investment to the customers in this category.

Michelin, Antin, Enviro to construct tyre recycling plant

In a boost to tyre recycling, European joint venture between Antin, Enviro and Michelin will construct its first used tyre recycling plant in Sweden. Antin and Enviro entered into the joint venture in March of 2023 to build a series of plants in chosen European geographies. Antin is a majority shareholder of the JV, Michelin a minority shareholder and Enviro has an option to become a significant minority shareholder. In addition to obtaining financing for the construction of the industrial plant, the JV signed a series of multi-year contracts regarding the supply of end-of-life-cycle tyres as well as recovered carbon black and pyrolysis oil.

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Eicher, ITC partner to promote sustainable logistics

Eicher Trucks and Buses, a division of VE Commercial Vehicles (VECV), joined hands with ITC to promote sustainable and environment friendly mid-mile logistics solutions across various ITC locations in India. As part of this collaboration, ITC, through its vendors partners, will progressively deploy over 100 units of India's first 5.5-tonne electric vehicle, the Eicher Pro 2055 EV, for mid-mile transportation from ITC warehouses to customer locations. First deliveries started from December 2023 and initial deployment includes the key metros of Delhi, Hyderabad, Mumbai, Bangalore, Chennai, Kolkata, Pune,

and Ahmedabad. This collaboration reflects the shared vision of both brands, to reduce their carbon footprint and support India's 'Net Zero' commitments. Eicher Pro 2055 EV, India's pioneering 5.5-t EV truck is building on the tradition of delivering best-in-class fuel efficiency and profitability. The 12ft deck-length truck will be furnished with two complete container solutions. It will offer both fast and slow charging alternatives tailored to specific application requirements. The service package takes into account the availability of charging infrastructure, operational needs, charging time limitations, battery capacity, and overall energy management strategies for the fleet. Additionally, the vehicle will feature Eicher's advanced telematics solution and will be supported by the My Eicher services. The deployment of electric vehicles will immensely help in promoting a planet friendly and cleaner transportation system aimed at cutting down carbon emissions.

VECV's future-ready solutions

VE Commercial Vehicles, a joint venture between the Volvo Group and Eicher Motors, displayed Made-in-India for the world and future-ready mobility solutions at Bharat Mobility Global Expo 2024. The range of sustainable and eco-friendly mobility solutions cover a range -of electric trucks and buses that offer customers and transporters a Pro Business, Pro Planet choice. Commemorating 15 years as a successful joint venture between Sweden's Volvo Group and India's Eicher Motors, VECV is actively pursuing its commitment to being the finest example of Make in India through sustainable technology, a robust product range and state-of-the-art manufacturing which are supplying products across the world.

SANY's Make in India lineup at Bharat Mobility

SANY India, a leading manufacturer of construction equipment, participates at the Bharat Mobility Global Expo 2024, showcasing its latest innovation in the construction equipment industry. The expo serves as an opportunity for SANY India to present its state-of-the-art machinery, contributing to the advancement of the construction industry. The Bharat Mobility Global Expo is taking place from February 1-3, 2024, at Bharat Mandapam, Pragati Maidan, New Delhi.

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Blue Energy decarbonises CV industry in India

Blue Energy Motors, a pioneer in green truck manufacturing, celebrates the International Day of Clean Energy on January 26, coinciding with India's Republic Day, by highlighting a significant milestone as its fleet of trucks has successfully prevented over 2,500 tonnes of CO_2 emissions since its inception. This amounts to approximate 30 per cent reduction of emissions from the air, an accomplishment that symbolises a tangible contribution towards a cleaner environment, reduced carbon footprint, and a sustainable future.

In India, the logistics sector is the third most CO2 emitting sector, with about 14 per cent share of emissions. Within logistics, heavy trucking contributes to 45 per cent of total CO_2 emissions.

To address this challenge, zero-emission trucks (LNG or battery-operated) have the potential to cut down at least 2.8-3.8 gigatons of CO_2 emissions between present to 2050. Aligned with this idea, Blue Energy Motors' commitment to decarbonisation has created a significant impact, equivalent to the positive environmental impact of CO_2 absorption by 100,000 trees in one year.

PPS Motors, Tata Hitachi launch 3S facility

PPS Motors, a part of the larger dealer network, inaugurated a brand new 3S facility for Tata Hitachi. Through this 3S facility, PPS Motors will be catering to the customers of the construction and mining equipment range of Tata Hitachi. With the opening of this facility, PPS Motors further strengthens its support to the consumers in the region.

By setting up five outlets, PPS will be catering to nine districts with a centralised headquarters in Salem. Strategically located on NH74 in Salem, the 3S facility is easily accessible by Chennai By-Pass. The outlets are located in Erode, Karur, Namakkal, Krishnagiri and Hosur covering all key customer locations and catering to their needs for service and spares.

Speaking on the Occasion, Rajiv Sanghvi, Managing Director, PPS Motors, said, "We are excited to partner with Tata Hitachi and inaugurate this state-of-the-art 3S facility in Salem. The investments that we have made in infrastructure, manpower and reach is a testament of our endeavor to create deeper and wider coverage for our customers and provide best in class ownership experience, maximise vehicle uptime and increase profitability.

Located at key industrial hubs across cities, the workshop offers easy accessibility to all customers, ensuring a convenient and hassle-free service experience. The facility is spread across 21,000 sq. ft with three service bays to ensure timely service and delivery to customer. The facility is equipped with advanced infrastructure and cutting-edge technology, enabling reliable repair services for a wide range of equipment.

Bridgestone Middle East wins technology award

Bridgestone Middle East, a global leader in sustainable mobility and advanced solutions, secured the renowned Tyre Technology Provider of the Year Award at the Truck and Fleet ME awards.

This achievement marks the third consecutive win for the company in the same category.

The key objective of the award ceremony, which was held in The Ritz Carlton, JBR, Dubai, was to recognise the remarkable milestones achieved by companies and their contributions to support the truck and fleet sector.

Bridgestone's achievement signifies its steadfast commitment to ensure continued innovation and excellence, as exhibited through the vast line-up of its cutting-edge products and services. The company developed these cutting-edge technologies to address unprecedented requirements of the sector for safe and economical transportation solutions.

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ELGi, D.V.P. Vacuum Technology sign tech agreement

Elgi Equipments, one of the world's leading air compressor manufacturers, announced its partnership with D.V.P. Vacuum Technology S.p.A., Italy, to manufacture, assemble, test, and sell D.V.P.'s proprietary vacuum products in India. With this agreement, ELGi will expand its product portfolio to include vacuum products. D.V.P. Vacuum Technology S.p.A., a manufacturer of vacuum pumps, will benefit from ELGi's robust manufacturing capability and extensive sales and service presence in India to gain access to the fast-growing Indian market. The global vacuum pump market has witnessed continuous growth in the last few years and is estimated to be $6 to 7 billion in 2024.

Apollo redefines toughness with EnduTrax tyre range

The infrastructure segment in the country is growing at a fast pace, and it is further getting a shot-in-the-arm due to the increased spending by the government year after year. Apollo Tyres provided an experiential drive to the Fleet Owners, Business Partners and Media, at the specially curated track at the NATRAX facility in Indore, to showcase its technological prowess, especially in the truck bus radial segment.

This first-of-its-kind experiential drive for commercial vehicle tyres in the country, at National Automotive Test Tracks (NATRAX), Indore, for aftermarket customers and media was organised to showcase the toughness of the Apollo EnduTrax range, which has been developed afresh with inputs from customers.

Sona Comstar receives auto PLI certification

Sona BLW Precision Forgings (Sona Comstar), a global provider of automotive technology solutions, has become the first automotive component manufacturer to receive certification under the Auto Production Linked Incentive (PLI) scheme. The company has filed seven applications for different products under the PLI scheme, and it has received the certification for its first product, a hub wheel drive motor for electric two-wheelers.

The company's R&D team designed and developed the EV traction motors in-house and launched them for production in 2020. Thanks to the customers' trust in its products, Sona Comstar has become one of India's leading manufacturers of EV traction motors. The company reaffirms its commitment to innovating and offering cutting-edge technologies to its discerning customers.

In 2021, the government introduced the Auto PLI scheme to incentivise the domestic production of high-value advanced automotive technology vehicles and products. The PLI scheme for the auto and auto component sector has a budgetary outlay of Rs 259 billion over five years, starting from FY 2023-24.

Elgi unveils portable screw air compressor

Elgi Equipments introduced the game-changing PG 550-215 trolley-mounted portable screw air compressor at the 12th edition of India Stonemart 2024 at the Jaipur Exhibition and Convention Centre (JECC), Rajasthan, India.

Also displayed at the ELGi booth 6, in the outdoor machinery area B, were ELGi's electric-powered PG110 E, PG 55 E, and PG 75 E portable air compressors for the mining industry. The 2024 edition of the International Stone Industry Trade Fair is expected to witness over 30,000 visitors and key decision-makers from the stone industry across the globe.

The newly introduced PG 550-215 is designed to deliver better performance, reliability, and profitability for customers in the construction and mining sectors. The compressor's 3-stage air filtration system enables optimal performance while the integrated control panel ensures improved safety, reliability, and driller-friendly operations. The compressor's Uptime design, which comprises large doors and a robust canopy, ensures easy maintenance, enhanced durability, and protection from extreme climatic conditions. In addition, ELGi's pan-India network of service centers and trained service technicians ensure seamless operations for every customer. The PG 110 E, 55 E, and 75 E series of electric-powered compressors, also on display, have been extensively adopted in standard pressure applications throughout the marble, granite, and blue metal quarries, where electricity is accessible and emission-free processes are required.

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Metso launches Remote IC

Metso's intelligent crushing and screening offering is expanding with a new software application called Metso Remote IC. The new Metso Remote IC is used for remote control and monitoring of the crushing and screening process and it connects wirelessly all the Lokotrack® crushers and screens at the site. With the Metso Remote IC app, the operator can view all the Lokotrack train machines and their main process parameters using a single dashboard. The feeder and crusher settings can be adjusted safely from the excavator cabin, and the overall visibility of the process allows the operator to adjust the feeding for an optimal production level. In problem situations, the Remote IC automatically stops the feeder, thus preventing overloading. It also instantly alerts and provides a reason for the stoppage, making it quicker and easier to get back to operation. With a lower overflow risk, the process can be run closer to maximum capacity.

The Metso Remote IC app can be used on Android tablet or mobile phone. It is available for all new Lokotrack models and can also be installed as a retrofit to all models that have the latest Metso Metrics installed. Metso Metrics is a cloud-based service for real-time performance information.

WOLFF Assist: Revolutionising service in real time

If the tower crane's control electronics suddenly fail during use, the brakes malfunction, or if problems arise during reeving, then you need quick and easy help. Wolffkran's response to this is WOLFF Assist, the digital remote maintenance system – hands-free and voice-controlled using smart glasses. Debuting at bauma in 2022, the remote assistance tool is now widely used by WOLFF service technicians, and leasing and purchasing customers can also benefit from it. The smart glasses make up the centerpiece of WOLFF Assist.

These smart glasses are worn on the head or attached to the helmet, allowing the person on the crane to have their hands free at all times, which is a major benefit in terms of safety and flexibility. The glasses transmit the field of vision of the technician on the construction site to WOLFF service experts in real time.

Haver & Boecker builds world's largest grizzly screen

Haver & Boecker Niagara custom-engineers the largest vibrating grizzly screen in the world. Manufactured with Hardox® steel perforated plates and grizzly bars for a large Brazilian iron ore operation, the Niagara XL-Class vibrating grizzly screen boasts a capacity of 8,000 tph and a cut size of 200 mm. As the largest exciter-driven machine in the industry, the XL-Class provides the operation with high-capacity screening while maximising uptime and production. Combined with the grizzly technology, the XL-Class offers the necessary ability to remove large stones, relieving pressure on the primary crusher. To maximise uptime, the customer opted to equip the XL-Class vibrating grizzly screen.

IN BRIEF

Auction prices declining for CE and trucks

With more new construction equipment and truck inventory available on dealer lots, auction prices for used units are trending downward, according to the latest Sandhills Global market report. Pandemic-related shortages drove late-model prices up in 2021 and 2022, but the market is rebalancing as factories have since ramped up production. Sandhills monitors used truck, semitrailer, qand farm machinery and CE markets. Buyers and sellers can use the data tracked in its EVI to make acquisition.

Western Global's popular FuelCube gets lighter

Upgrades have been made to the FuelCube, Western Global's popular on-site fuel tank with several new features. The upgraded FuelCube comes in 250-, 500-, 1,000- and 1,800-gallon sizes to match jobsite capacity requirements. According to Western Global, the new design uses less metal than the previous model, making the 250- and 500-gallon versions light enough to be relocated with a pallet jack. The reduced weight also allows the cubes to be hauled simultaneously with other heavy equipment.

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Wimmer intros largest tunnel excavator

Wimmer International has introduced its largest tunnel excavator, the 22-metric-ton YellowFox. While its Badger series is ideal for smaller tunnel cross sections up to 11.5 feet, the company says the YellowFox can reach working heights up to 13.8 feet.

The YellowFox is based on the Liebherr platform, using a design custom-made for Wimmer. It features a Liebherr 914 Compact Litronic superstructure and a Liebherr 920 Compact Litronic undercarriage. Like the Badger series, the excavator boom is designed by Wimmer.

Powered by a 120-horsepower Tier 4 Final engine, the YellowFox has a breakout force of 120 kN and a tear force of 115 kN. The boom can swivel 45 degrees to the left and right. It comes equipped with a push rod to protect the cylinder from falling debris. Wimmer has also placed the hoses and lines in locations protected from damage.

A central lubrication system, a reversible fan, a two-grouser bottom plate with a chain scraper, a refueling pump, a Tunnel A-Lock quick coupler

with SUVA type-examination certificate, and fire-resistant hydraulic oil (PAG) come standard.

Standard safety equipment on the YellowFox includes an integrated fire extinguishing system and an emergency stop button. A Blaxtair person detection system is an available option.

Husqvarna debuts smallest demolition robot

Husqvarna has rolled out its smallest, lightest remote-control demolition robot, the DXR 95, designed for indoor work in confined conditions. Despite its compact size, the robot packs a strong punch, the company says, with its 13-horsepower engine and 3,626 pounds per square inch of pressure at the end of the arm tool. It weighs 1,299 pounds and can be transported in a van. It can fit through narrow passages, thanks to its 36.3-inch width. It can traverse inclines as steep as 30 degrees, and it has a reach of about 10 feet with breaker. It comes with a range of attachments, including a concrete crusher, two hydraulic breakers, and buckets.

John Deere, Leica Geosystems partner on SmartGrade

John Deere has entered a partnership with Leica Geosystems, part of Hexagon, to help accelerate its digital transformation. The companies are working together to develop solutions that improve productivity and reduce material costs. Integration of the Leica Geosystems technology will be part of the SmartGrade packages, further reducing the number of pass required, which can help improve safety by minimising traffic on construction sites.

Combined, the engineers at John Deere will have access to the positioning and sensor technology developed by Leica Geosystems. "Working with Leica Geosystems is a tremendous opportunity, as their advanced technology solutions, paired with the power and performance of the John Deere construction equipment lineup, makes for a highly productive, efficient, and seamless jobsite for our customers," Colvin added.

IN BRIEF

Hitachi CMA opens new HQ in Georgia

Hitachi Construction Machinery Americas held a ceremony to open its new headquarters in Georgia for the development and production of new machinery and to elevate customer support. The company entered the North American market more than 40 years ago, opening an office in Marietta, Georgia, in 1981. Since then, it has continued to expand sites within the state. The site was originally established as a wheel loader assembly and manufacturing plant in 1987 and has served as company headquarters since 2018.

Tigercat releases 4161-15 mulching head

Designed to reduce the build-up of woody debris on forest floors, Tigercat has released the new 4161-15 mulching head for its LX830E track carrier.

Tigercat says the machine can clear steep slopes and operate within dense stands to help foresters, landowners, governments, and environmental organisations reduce the amount of accumulated fuel and guard against future wildfires.

The 4161-15 head has a 59-inch mulching swath and 130-degree wrist pivot.

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SCAN FOR ENQUIRY

Moog to create all-electric jobsites

Looking at what multiple heavy equipment manufacturers are doing with electrification, Moog Construction decided to start from scratch. From a research perspective, the approach was more to determine what is necessary for electrification to happen and what would it look like. Nominated for an Intermat Innovation Award, the ZQuip energy kit, which converts diesel-powered construction fleets into zero-emissions machines, was first demonstrated with the conversion of a Caterpillar 308 excavator. The ZQuip battery modules are standalone energy units. They can exist three ways on a jobsite: on a machine; off the machine on a charger; or off the machine as a genset.

"We wanted to look at this as a way of seeing what are all the different ways that you would need to utilise energy on a site and how do we make sure that this super expensive and smart thing we have has full utilisation," said Chris LaFleur, ZQuip managing director. ""We need to start decoupling the

machines from batteries and energy. They're different technologies, they're different advancements. It's important knowing what happens with batteries is that your whole focus needs to be getting the most utilisation, the most value and the most life out of that piece of an asset."

Hamm's new HC 250i C VC roller crushes & compacts

Hamm's new HC 250i C VC compactor with vibration crusher drum can simultaneously crush and compact mixed soils, stone and other materials. By combining two processes in one, contractors can use fewer machines on the job, saving time and money and reducing carbon emissions by up to half in some cases, the company says.

Powered by a six-cylinder Deutz engine, the HC 250i C VC has three-point articulation, which differs from conventional joints due to its geometric arrangement and connection of three individual joints and one additional connecting link between the two conventional upper joints. According to

Hamm, the three-point articulation assists in providing optimum steering and safety while on difficult terrain.

Also, the new compactor includes reinforced components around the front frame and underbody to assist in the management of tough applications.

The type of compactor designation is reflected in the initials "C" to symbolise the reinforced drum drive and "VC" for vibration crusher.

MEC's 2-in-1 telescopic, articulated boom lift

MEC has released the new DualReach 85-J Boom, a two-in-one machine capable of operating as both a telescopic and articulated boom lift.

While in park, users can select either telescopic mode for maximum outreach or articulated mode for up-and-over tasks. MEC says the patent-pending design enhances productivity and reduces costs by meeting multiple work-at-height needs with one machine. Powered by a 74-horsepower Deutz Turbo-Charged Tier 4 engine, the 85-J has a working height of 91 feet. It has a maximum outreach of 70 feet.

IN BRIEF

Hitachi upgrades lineup of ZAXIS-5N compact excavators

Hitachi has upgraded the features of its ZAXIS-5N compact excavators ranging from 1.7 to 6 tons to enhance versatility and performance.

This line of machines, including the ZX17U-5N, ZX26U-5N, ZW30U-5N, ZX35U-5N, ZX50U-5N, and ZX60USB-5N, is designed to assist operators in completing work efficiently in more congested urban or other tight workspaces. Ranging from 14.7 to 53.8 net HP, the machines feature short tail swing radius ultra-short tail swing radius with USB.

CNH posts positive 2023 revenues

In its second year as a construction company, CNH reported record revenues and net income for 2023. With an increased allocation to research and development and capital expenditure investments, a total of 72 new products were launched in 2023, many of which integrated with in-house tech solutions. The company's portfolio of construction equipment is sold under three brands: Case Construction Equipment, New Holland Construction, and most recently, Eurocomach, part of the portfolio acquired with Sampierana.

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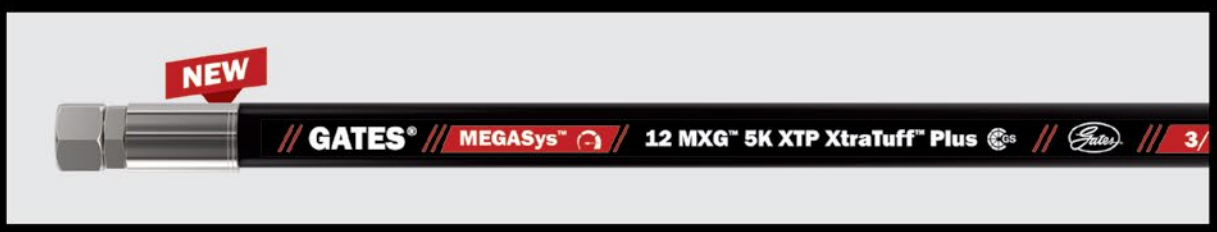

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AI: RESHAPING THE EQUIPMENT LANDSCAPE

Using artificial intelligence on construction machines can optimise work processes and rise efficiency.

Scan to read

In the realm of construction, the integration of Artificial Intelligence (AI) and Machine Learning (ML) technologies has emerged as a transformative force, reshaping the landscape of construction machinery. Gone are the days of relying solely on brute force and manual labour; today, intelligent machines equipped with AI and ML algorithms are revolutionising the construction industry, making operations safer, more efficient, and highly precise.

Fusion of AI and ML in CE

The fusion of AI and ML in construction machinery marks a paradigm shift in how tasks are executed on construction sites. Traditional construction equipment, such as excavators, bulldozers, and cranes, has been enhanced with sophisticated sensors, cameras, and intelligent algorithms that enable them to perceive and respond to their environment autonomously.

One of the most significant advancements facilitated by AI and ML is predictive maintenance. Construction machinery is subjected to rigorous usage in harsh environments, leading to wear and tear over time. Predictive maintenance algorithms leverage ML to analyse data from sensors embedded in machinery, predicting potential failures before they occur. This proactive approach minimises downtime, reduces repair costs, and enhances overall operational efficiency.

Moreover, AI-powered machinery offers real-time monitoring capabilities, allowing operators to remotely track equipment performance, productivity metrics, and operational parameters. By harnessing data analytics, construction companies can make informed decisions, optimise resource allocation, and streamline project management processes.

Enhancing safety and productivity

Safety is paramount in the construction industry, where workers are exposed to various hazards daily. AI and ML technologies play a pivotal role in enhancing safety protocols on construction sites. For instance, autonomous vehicles equipped with AI-driven collision avoidance systems can detect obstacles, workers, and other vehicles in their vicinity, mitigating the risk of accidents and injuries.

Furthermore, AI-powered drones are revolutionising surveying and mapping processes in construction projects. Equipped with high-resolution cameras and advanced imaging algorithms, drones can conduct aerial surveys with unparalleled accuracy and efficiency. This not only expedites the surveying process but also minimises the need for workers to access hazardous or hard-to-reach areas, reducing potential safety risks.

In terms of productivity, AI and ML algorithms optimise construction workflows by analysing historical data, identifying patterns, and recommending optimal strategies.

For example, predictive analytics can anticipate material requirements, equipment utilisation rates, and project timelines, enabling construction companies to allocate resources effectively and complete projects on schedule.

Role of Robotics in construction

Robotics is another facet of AI and ML revolutionising the construction industry. Robotic systems, ranging from autonomous bricklaying machines to robotic arms for concrete pouring, are augmenting human labour and accelerating construction processes. These robots excel in repetitive tasks, such as laying bricks or assembling prefabricated components, with unparalleled precision and consistency.

Moreover, collaborative robots, or cobots, are designed to work alongside human operators, enhancing both efficiency and safety. Cobots can assist in heavy lifting, repetitive tasks, and hazardous operations, reducing the risk of musculoskeletal injuries and fatigue among workers.

Future outlook

As AI and ML technologies continue to evolve, the future of construction machinery appears increasingly intelligent and autonomous. Innovations such as swarm robotics, where multiple robots collaborate to achieve complex tasks, and 3D printing of construction materials using AI-controlled robotic arms, are poised to revolutionise the industry further. Furthermore, the integration of AI with Building Information Modeling (BIM) software is unlocking new possibilities in design optimisation, project visualisation, and predictive modeling. By leveraging AI-generated insights, architects and engineers can create more sustainable, cost-effective, and resilient structures.

However, with these advancements come challenges related to data privacy, cybersecurity, and workforce displacement. Addressing these concerns requires proactive measures, including robust data encryption protocols, cybersecurity training for personnel, and upskilling initiatives to equip workers with the necessary skills to operate and maintain AI-driven machinery.

Conclusion

AI and ML technologies are reshaping the construction industry, empowering machinery with intelligence, autonomy, and predictive capabilities. From predictive maintenance and real-time monitoring to enhancing safety and productivity, the integration of AI and ML in construction machinery is unlocking unprecedented efficiency and innovation. As we embrace this technological revolution, it is imperative to navigate the challenges responsibly and harness the full potential of AI and ML to build a safer, smarter, and more sustainable future for construction.

In conclusion, AI and ML are not just buzzwords; they are transformative technologies that are revolutionising the construction industry. By enhancing safety, improving productivity, and enabling innovation, AI and ML are paving the way for a more efficient and sustainable construction sector. As we continue to harness the power of these technologies, it is crucial to prioritise ethical considerations, ensure data security, and invest in workforce development to fully realise the benefits of AI and ML in construction machinery.

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TRANSFORMING CONSTRUCTION!

Construction companies can schedule proactive maintenance, preventing breakdowns and minimising unplanned downtime.

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In the ever-evolving landscape of construction, technological innovations continue to shape the industry, and at the forefront of this revolution is the integration of Artificial Intelligence (AI) in construction equipment. Exciting innovations could be noticed in AI-driven construction equipment with multitude of advantages to the construction sector. Among many other things we could notice that the predictive maintenance is the centre of focus as on date.

Innovations in AI-driven CE

The integration of AI into construction equipment marks a revolutionary leap forward in the industry. Traditionally, construction equipment relied on manual operation, often limited by human capabilities. However, AI-driven equipment brings a new level of intelligence, learning, and adaptability to machinery. From excavators to bulldozers, these machines are now capable of real-time analysis, decision-making, and optimisation.

One notable innovation is the use of AI algorithms to enhance the performance of construction equipment. These algorithms can analyse a plethora of data in real-time, including soil conditions, material weight and environmental factors, to optimise the equipment's operations. The result is not just improved precision but also increased safety and efficiency in construction processes.

Advantages of AI-driven CE

The advantages of incorporating AI into construction equipment are manifold, offering benefits that go beyond traditional methods.

- **Precision and efficiency:** AI-driven equipment, through its ability to analyse data and adapt in real-time, significantly improves precision in construction tasks. Whether it's excavating, lifting, or navigating complex terrains, these machines operate with heightened accuracy. This, in turn, translates into increased efficiency as tasks are performed more swiftly and accurately.
- **Safety enhancement:** With AI, construction equipment becomes safer and more reliable. The ability to assess environmental conditions and adjust operations accordingly minimises the risk of

Predictive maintenance, a proactive strategy that leverages the power of data analytics and machine learning to forecast potential issues before they become critical.

accidents. Autonomous construction vehicles, guided by AI, can navigate through construction sites with enhanced safety, avoiding obstacles and optimising routes.

- **Resource optimisation:** AI algorithms can analyse data on material usage, equipment performance, and workforce efficiency to optimise resource utilisation. This data-driven approach empowers construction companies to make informed decisions, ensuring that resources are allocated where they are most needed. This, in turn, contributes to project cost-effectiveness.
- **Operational adaptability:** AI-driven equipment adapts to changing conditions, making it suitable for a variety of construction projects. Whether it's a large-scale infrastructure project or a more nuanced task, these machines can adjust their operations to meet specific project requirements.
- **Reduced downtime:** Unplanned downtime is a significant concern in construction projects, often resulting in delays and increased costs. AI addresses this challenge by proactively identifying potential issues and optimising maintenance schedules. The result is reduced downtime and enhanced project continuity.

Power of predictive maintenance

One of the standout features of AI-driven construction equipment is its ability to usher in a new era of maintenance practices – predictive maintenance. Traditionally, maintenance was reactive, with repairs conducted after a piece of equipment had already failed. This approach often led to costly downtime and repairs.

AI changes the game by introducing predictive maintenance, a proactive strategy that leverages the power of data analytics and machine learning to forecast potential issues before they become critical. Embedded sensors collect a wealth of data on various parameters such as temperature, vibration, and usage patterns. AI algorithms then analyse this data to identify patterns indicative of wear and tear or potential failures.

By foreseeing maintenance needs, construction companies can schedule proactive maintenance, preventing breakdowns and minimising unplanned downtime. This not only increases the lifespan of the equipment but also results in substantial cost savings for construction projects.

Real-world examples

Several real-world examples showcase the impact of AI-driven construction equipment and predictive maintenance. For instance, a construction company utilising AI-enabled cranes experienced a significant reduction in operational errors and accidents. The AI algorithms continuously assessed factors such as wind speed, load weight, and equipment condition, adjusting crane operations in real-time to ensure optimal safety and efficiency.

In L&T, about 13,000 critical construction equipment are IoT enabled and AI/ML based data analytics helping in improvement of productivity and reduction in operational errors and accidents.

Also, in 3D machine control technology, take levelling for instance — a machine control system enables grading tractors to compare a digital grading map to the position of the blade and cut it to the proper elevation and position on the job site.

In another example, a fleet of AI-driven autonomous construction vehicles was deployed on a large infrastructure project. These vehicles navigated the construction site with precision, avoiding obstacles and optimising routes. The result was not only improved efficiency but also enhanced safety, as the vehicles seamlessly adapted to the dynamic environment.

Challenges and future considerations

While the advantages of AI-driven construction equipment and predictive maintenance are clear, challenges exist. Data security is a critical concern, especially considering the sensitive information generated and analysed by these systems. Robust cybersecurity measures must be in place to protect against potential breaches and unauthorised access.

Moreover, the initial investment required for implementing AI technology may be a barrier for some construction companies. However, it's essential to view this as a strategic

AI-driven equipment adapts to changing conditions, making it suitable for a variety of construction projects.

long-term investment that pays dividends through improved efficiency, reduced maintenance costs, and overall project success.

Looking ahead, the future of AI in construction equipment holds even more promise. As technology continues to advance, we can anticipate even more sophisticated AI algorithms, capable of autonomous decision-making and seamless adaptation to dynamic construction environments. The integration with other emerging technologies, such as the Internet of Things (IoT) and advanced robotics, will further amplify the capabilities of AI-driven construction equipment.

Conclusion

In conclusion, the innovations in AI-driven construction equipment represent a significant leap forward for the construction industry. The advantages of precision, efficiency, safety enhancement, resource optimisation, and reduced downtime are reshaping the way construction projects are executed. The incorporation of predictive maintenance, powered by AI and machine learning, ensures that equipment operates at its optimal level, minimising disruptions and maximising longevity.

As construction companies embrace these technologies, they position themselves at the forefront of industry innovation, ready to tackle the challenges of tomorrow's infrastructure projects. The marriage of AI and construction equipment is not just a technological leap; it's a transformation that paves the way for a more efficient, sustainable, and technologically advanced future in construction. The construction site of tomorrow is not just a place where structures are built; it's a dynamic ecosystem where AI-driven equipment collaborates seamlessly with human expertise to create tomorrow's world.

ABOUT THE AUTHORS:

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Amit Singh is Digital Officer at Larsen & Toubro. With 12+ years of experience in setting up startups in India and Bahrain, Singh has helped various industries such as construction, telecom, agriculture, retail etc. for adopting new age technologies to improve productivity and transparency. In his current role with L&T construction, he has led the Digital Initiatives at MAHSR C6 ($1 billion project).

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AUTOMATION AND THE EMBRACE OF TECHNOLOGY

Construction sites are inherently dangerous and automated equipment can significantly improve on-site safety, especially of the workers working there.

India is building up its infrastructure at an unprecedented rate as it seeks to transform itself from an emerging economy into a developed country by 2047. The government, in its recent interim budget announced a 33 per cent increase in capital expenditure on infrastructure for 2023-24 amounting to 3.3 per cent of GDP.

At the same time, analytics and research firm Crisil estimates that the country is set to spend Rs 143 lakh crore on infrastructure over the next seven years through 2030, more than double what it spent in the preceding seven years.

This surge in infrastructure spending is palpable across the nation, with massive projects underway in various sectors. From the bustling metro projects in metropolitan cities like Mumbai to the expansion of crucial highways such as the Pune-Bengaluru corridor, signs of progress are evident. The modernisation of airports, upgradation of ports, and revamping of logistics networks further underscore India's infrastructural ambitions. Additionally, efforts to develop inland waterways and construct dedicated freight corridors contribute to the comprehensive infrastructural overhaul underway.

The construction sector, being the driving force behind these monumental projects, stands to benefit immensely from this infrastructural surge. The infra push promises to be a windfall for the sector, with only 20 per cent of the infrastructure that will be needed by 2050 currently built. It will make the country the third largest construction market in the next two-to-three years.

More crucially, it will carry the sector, which already accounts for 9 per cent of India's GDP and is the country's second largest employment generator, past the $1 trillion milestone by as early as 2025. This, to be sure, represents a singular opportunity. But, unleashing this trillion-dollar potential will depend, unsurprisingly, on the sector's embrace of technology.

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Digital technology is drastically changing the way we live, work, eat, shop, consume content, travel, make transactions, and stay connected in our daily lives. Machine Learning, the Internet of Things, Artificial Intelligence (AI), entire industries, from banking to manufacturing, is being upended and disrupted by new-age technology.
The same is true for construction. Traditionally reluctant to embrace change, the construction sector is slowly but surely turning to digitisation, robotics, AI and autonomy to address its challenges and unlock a higher level of growth. This embrace of technology is happening on two fronts — on the assembly line and on the construction site.

On the manufacturing front, construction equipment manufacturers are increasingly adopting Industry 4.0 practices to improve efficiency, streamline operations, and enhance overall productivity. They are automating multiple aspects of the manufacturing process such as welding, painting and assembly. They are also using automated guided vehicles (AGV) and mobile robots for material handling and transportation and harnessing the power of computer-aided design (CAD) and computer-aided manufacturing (CAM). These technologies enable the fabrication of automated components and 3D models of machinery, cutting the time and expense of generating parts and minimising mistakes.

At CASE Construction Equipment, to cite our example, the manufacturing, research and designing process are all aided by automation on various levels. Our Pithampur facility is designed with cutting-edge automation technologies to manufacture superior-quality products. The automation includes robotics welding which gives welding joints superior strength and robustness. This helps in the repeatability of the same welding, minimises human error and maintains consistency in quality.

Our ultra-modern paint shop uses both Manual and Automated Paint operations providing aesthetically appealing products. It also boasts eco-friendly next-gen technology ensuring that the paint lasts longer.

Automation in CE industry

Additionally, we use automation in laser cutting, gas cutting, and in our machining centres. Similarly, the products themselves are becoming increasingly smarter and automated. These machines have the ability to function remotely and autonomously, made feasible by the incorporation of cutting-edge communication and artificial intelligence technology within them. Cranes, excavators, and trucks — which are widely used for numerous construction activities — are all being equipped with automated technology.

The benefits of automation are manifold. Construction sites are inherently dangerous and automated equipment can significantly improve on-site safety, especially of the workers working there. Automation also increases equipment efficiency and removes the need for human involvement during operation, lowering the overall cost of the construction project. It is anticipated that this will increase demand for automated construction equipment over currently available equipment.

Telematics and IoT boost CE efficiency

Telematics and IoT are other aspects of automation that are finding their way in construction equipment. Telematics and IoT give customers real-time data about the performance and operation of their equipment. Telematics in construction equipment involves the use of sensors, GPS tracking, and other technologies to monitor and transmit real-time data about equipment performance, location, and usage.

Sensors gather this information, which is then sent across a wireless communication network to a central server. Software programmes are then used to evaluate the data in order to provide information about the fuel usage, maintenance requirements, and productivity of the equipment. The benefits of telematics include improved equipment efficiency and productivity, reduced downtime, proactive maintenance, and optimised equipment utilisation.

As India embarks on this transformative journey of infrastructural development, collaboration between the public and private sectors will be crucial. Investment in technological infrastructure, workforce upskilling, and regulatory frameworks conducive to innovation are imperative to realising the full potential of technology-driven construction. Moreover, continued research and development initiatives are essential to stay abreast of emerging technologies and industry trends.

India's infrastructure boom presents a monumental opportunity to propel the nation towards its aspirations of economic prosperity and global leadership. By embracing technology as a catalyst for change, the construction sector stands poised to not only meet the burgeoning demand for infrastructure but also spearhead a paradigm shift towards sustainable, efficient development. As the physical and digital realms converge, India's journey towards becoming a developed nation is not just a matter of bricks and mortar but a testament to the transformative power of innovation.

ABOUT THE AUTHOR:
Shalabh Chaturvedi is Managing Director of CASE Construction Equipment – India & SAARC region. Case is one of the leading manufacturers of construction equipment in India.

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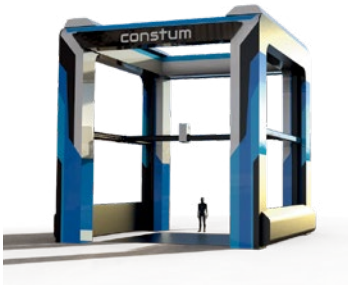

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HOW AI AND ML ARE REVOLUTIONISING CE IN INDIA

AI enables machines to perform tasks requiring human intelligence, such as decision-making and pattern recognition, while ML allows systems to learn from data and make predictions.

Scan to read

India's construction industry, a critical driver of the nation's economic growth, relies heavily on a diverse fleet of equipment – from the earth-moving might of excavators and backhoe loaders to the precision handling of telescopic handlers and mobile cranes. However, the industry continues to face challenges like skilled labour shortages, safety concerns, and inefficient processes.

Enter the new wave of innovation

Artificial Intelligence (AI) and Machine Learning (ML). These transformative technologies are poised to revolutionise the way we operate construction equipment, unlocking a future of smarter, safer, and more efficient operations.

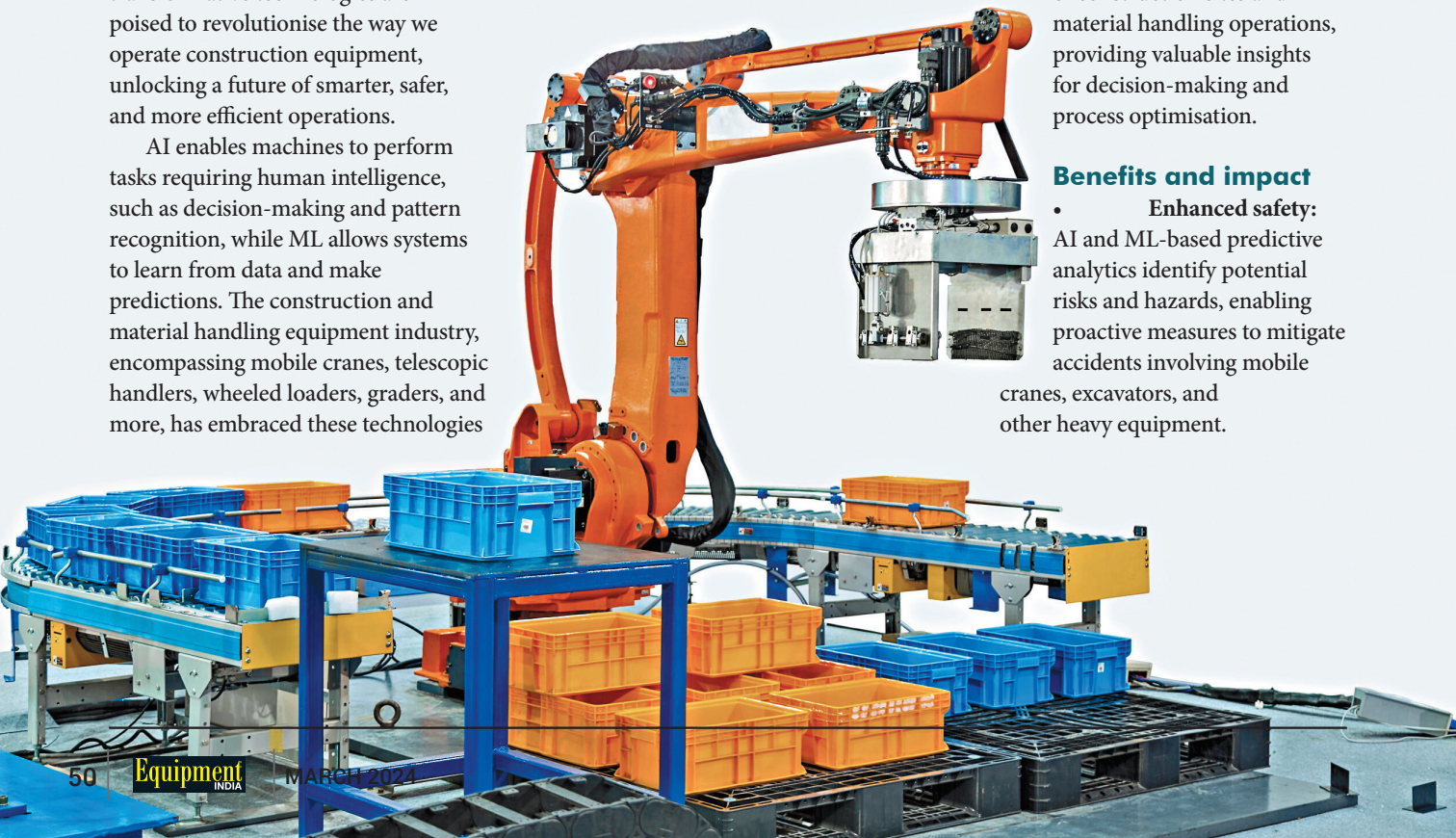
AI enables machines to perform tasks requiring human intelligence, such as decision-making and pattern recognition, while ML allows systems to learn from data and make predictions. The construction and material handling equipment industry, encompassing mobile cranes, telescopic handlers, wheeled loaders, graders, and more, has embraced these technologies to address various challenges and unlock new opportunities.

Applications of AI and ML

- **Predictive Maintenance:** AI and ML algorithms analyse real-time data from equipment sensors to predict potential failures and schedule maintenance proactively, reducing downtime for excavators, backhoe loaders, and other heavy machinery.
- **Autonomous and semi-autonomous equipment:** AI-powered systems enable the development of autonomous and semi-autonomous construction vehicles, robotic material handling equipment like telescopic handlers, Skid Steer Loaders and self-driving wheeled loaders, enhancing safety and efficiency on job sites.
- **Performance optimisation:** ML algorithms optimise equipment performance, fuel efficiency, and energy consumption of compactors, graders, and other machines, leading to cost savings and reduced environmental impact.
- **Real-time monitoring and data analytics:** AI and ML technologies enable real-time monitoring of construction sites and material handling operations, providing valuable insights for decision-making and process optimisation.

Benefits and impact

- **Enhanced safety:** AI and ML-based predictive analytics identify potential risks and hazards, enabling proactive measures to mitigate accidents involving mobile cranes, excavators, and other heavy equipment.



Information is shared with the operator, owner and dealers.

- **Improved operational efficiency:** By optimising performance, reducing downtime, and streamlining processes, AI and ML contribute to increased operational efficiency and cost savings for construction and material handling operations.
- **Productivity gains:** Automation, real-time monitoring, and data-driven decision-making enabled by AI and ML significantly boost productivity levels in the use of big excavators, graders, and other equipment.
- **Job creation and upskilling:** The adoption of AI and ML creates new job opportunities and demands for skilled professionals in areas like data analytics and system integration.

Challenges and considerations

- **Data security and privacy:** Robust data security measures are required to protect sensitive information and ensure compliance with relevant regulations.
- **Integration challenges:** Seamless integration of AI and ML technologies with existing infrastructure and workforce in the construction and material handling equipment industry can be complex.
- **Regulatory and compliance considerations:** Safety, data privacy, and ethical concerns related to AI and ML technologies must be addressed.

Emerging trends

The integration of AI and ML "with other technologies like 5G and the Internet of Things (IoT) holds immense potential. Imagine excavators communicating with each other in real-time to optimise earthwork operations, or telescopic handlers

automatically adjusting their settings based on the weight and dimensions of lifted materials. This is the future, and it's closer than you think.

Targeted applications

- **Excavators and backhoe loaders:** AI-powered sensors can predict component failures, preventing costly downtime and ensuring peak performance.
- **Compactors and skid steer loaders:** ML algorithms can optimise compaction patterns and route planning, leading to smoother surfaces and faster completion times.
- **Mobile cranes and telescopic handlers:** Advanced AI can analyse lifting scenarios in real-time, maximising efficiency and ensuring operator safety.
- **Wheeled loaders and graders:** ML-driven systems can adjust operating parameters based on terrain and load conditions, optimising fuel consumption and extending equipment life.

Investment in AI and ML solutions, coupled with a skilled workforce, can position India as a global leader in this domain, fostering sustainable growth and development in the construction and material handling equipment sector.

Conclusion

The integration of AI and ML technologies in India's construction and material handling equipment industry, encompassing excavators, backhoe loaders, compactors, skid steers, mobile cranes, telescopic handlers, wheeled loaders, graders, and more, is a game-changer. It offers unprecedented opportunities for efficiency, safety, and sustainability. Proactive adoption and adaptation to these transformative technologies are essential for companies to remain competitive and drive long-term growth.

By leveraging the power of AI and ML, the construction and material handling equipment sector can unlock new levels of productivity, enhance safety measures, and contribute to the nation's infrastructure development goals. Continuous exploration, investment, and collaboration will be the key to realising the full potential of these cutting-edge technologies and shaping a future where innovation and sustainability go hand in hand.

ABOUT THE AUTHOR:
Sanjay Pendharkar is Co-Founder and Chief Consultant at Whetstone Group. He is an accomplished professional with over 35 years of dedicated experience in the construction and material handling equipment industry. Having worked extensively across PAN India and in Southeast Asia, he has gained a global perspective and invaluable insights into the industry. Presently, he serves as a knowledge partner for several multinational corporations and startups.

AN INSIGHT INTO THE FUTURE

Scan to read

The company's plant software, though not fitting into any conventional AI and autonomous operations philosophies entirely, has begun incorporating ML algorithms to a certain extent.

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into the construction equipment industry heralds a new era of efficiency and innovation. As the construction sector evolves, the adoption of AI and ML technologies is becoming a critical factor in driving operational excellence and sustainability. This article delves into how AI and ML are reshaping the construction dynamics, focusing on the innovative approaches and practical applications within the equipment domain.

Innovations in AI-driven construction equipment

The traditional construction equipment landscape is undergoing a significant transformation with the incorporation of AI and ML technologies. This shift is not just about automation but enhancing the equipment's intelligence, making it capable of performing tasks with precision, efficiency, and minimal human intervention. The introduction of AI in construction equipment brings forth innovations such as autonomous machinery, predictive maintenance, and optimised operational performance.

Feasibility and advantages of AI and ML integration

Incorporating AI and ML into construction equipment is not merely a technological leap; it's a practical move towards optimising performance, reducing downtime, and ensuring safety on construction sites. The feasibility of this integration lies in the tangible benefits it offers, such as improved equipment utilisation, enhanced safety protocols, and significant cost savings through predictive maintenance and fuel efficiency.

For instance, our plant software, though not fitting into any conventional AI and autonomous operations philosophies entirely, has begun incorporating ML algorithms to a certain extent. These algorithms are used for automatic in-flight corrections by sampling previous drops from bin gates and predicting in-flight values, thus enhancing accuracy and reducing waste. Additionally, our systems utilise algorithms for First In, First Out (FIFO) operations, adjusting speeds and fuel injection to optimise the process flow.

Predictive maintenance and efficiency improvement

A notable application of AI and ML in construction equipment is predictive maintenance. By analysing data from large motors, such as those in mixers and conveyors, ML algorithms can predict potential failures before they occur. This proactive approach not only prevents equipment downtime but also extends the lifespan of the machinery, translating into cost savings and increased operational efficiency.

Our IoT solutions, which are soon to be launched, will incorporate ML algorithms for predictive maintenance, focusing on monitoring temperature and vibration characteristics. This innovation aims to identify potential failures in advance, allowing for timely corrective actions. Moreover, the integration of Bluetooth Low Energy (BLE) based fuel sensors will enable accurate fuel level monitoring, detect pilferage, and maintain efficient fuel inventory through ML algorithms.

The road ahead

The construction equipment industry's journey towards integrating AI and ML is just beginning. While challenges such as data security, initial investment costs, and technology adoption barriers exist, the potential benefits far outweigh the hurdles. The future of construction is undeniably smart, with equipment that not only performs tasks but also learns from them, continuously improving and adapting to the evolving demands of the construction sector.

As we stand on the brink of this transformative era, it's clear that AI and ML will play a pivotal role in shaping the future of construction dynamics. The innovations and advancements in AI-driven construction equipment promise a more efficient, safe, and sustainable industry. The journey towards a fully automated and intelligent construction site is underway, and the possibilities are limitless.

In conclusion, the integration of AI and ML into construction equipment represents a significant leap forward for the industry. As we explore and expand the capabilities of this technology, the construction sector is set to witness unparalleled levels of efficiency, safety, and innovation. The era of smart construction is here, and it is redefining the dynamics of construction with every step forward.

ABOUT THE AUTHOR:
Dheeraj Panda is Managing Director of Ammann India, one of the leading suppliers of mixing plants, machines and services to the construction.

TRANSFORMING PRE-OWNED CE INDUSTRY

Scan to read

In the used construction equipment industry, CRM plays a pivotal role in fostering lasting relationships with clients and optimising business processes.

Artificial Intelligence (AI) and Machine Learning (ML) are no more a concept of the future but it happening right now. Many construction equipment manufacturers are implementing AI and ML in their machines for various benefits that would arise from it such as autonomous machinery, predictive maintenance, energy efficiency, cost savings and more. Similarly, the used construction equipment industry is no exception.

Shriram Automall India (SAMIL) being India's largest Phygital marketplace for vehicles and equipment offers a number of advanced SaaS-enabled services like Phygital auctions, online auctions, ThePriceX, self-inspection and valuation to enhance the customer experience and satisfaction in the used construction equipment industry.

One India One Click: Redefining Phygital way

To address the challenges associated with cross-border transactions, Shriram Automall has introduced the innovative concept of One India One Click - Phygital auction through MySAMIL App. This pioneering initiative enables customers to seamlessly buy and sell pre-owned construction equipment across state borders with a single click, transcending geographical constraints and simplifying the procurement process. Through this platform, customers gain access to an extensive inventory of pre-owned construction equipment from 120+ automalls across the country, eliminating the need for physical travel and streamlining the transaction process.

With this model, we are enabling sellers from a particular state who can exchange their machines, which are registered in another state parked in a different state to a buyer from his state or any other Indian state. For example, a seller in West (Ahmedabad) can

exchange his/her equipment registered in East (Nagaland) but parked in a yard in North (Manesar) to a buyer from South (Bengaluru). Buyers and sellers can flawlessly transact used construction equipment of all makes and models.

Digitisation: Paving the way for efficiency

In an era marked by digital transformation, the construction equipment industry is swiftly adapting to the online landscape. Online platforms (powered by AI & ML) such as www.cartradeexchange.com/ and bids.samil.in/ exemplify this digital revolution, facilitating the buying and selling of pre-owned construction equipment with unprecedented ease and efficiency. These state-of-the-art online auction portals leverage cutting-edge technologies to streamline transactions, ensuring a seamless experience for both buyers and sellers. Robust security protocols safeguard user data, while comprehensive ERP solutions enable end-to-end management of vehicles and equipment, including repossessions, yard management, and dealership operations. Moreover, users benefit from invaluable insights, historical data analytics, price guidance tools, and cloud-based solutions, enhancing decision-making processes and optimising outcomes.

ThePriceX: Harnessing AI and ML for precision

One of the industry's ground-breaking innovations is ThePriceX, an advanced price prediction engine developed by SAMIL. Through this advanced application, SAMIL is able to get the fair prices and price trends of used construction equipment of different categories and capacities. It becomes inevitable to used AI and ML in applications like this because it is highly difficult to predict accurate price of any construction equipment as each and every machine is unique due to their different usage, running time, physical condition, performance, engine life, hydraulics condition, fatigue generated in the joints and arms, age and more such parameters which goes up to 100 in some machines.

The algorithm considers the selling price of particular equipment from auction data of 120+ Automalls pan-India for providing the fair price. The auction data fed to the database of ThePriceX comprises of nearly all the models from different manufacturers over a period of 13 years. This price derived from the application helps in taking informed decision for transacting used construction machines for various industry verticals like Banks, NBFCs, Insurance companies, Construction companies, Leasing companies and the likes.

This tool is being enhanced by Indian Institute of Technology – Delhi for improved functionality with machine learning algorithms and statistical modelling that mature over a period of time which will take ThePriceX to a higher stage of delivering exceptional results in price prediction. One can easily say that it's a scientific & insightful approach to price discovery of used construction equipment across the length and breadth of the country.

Adroit Auto 3.0: Self-inspection and valuation

Adroit 3.0 marks a significant leap forward in the inspection and valuation industry, building upon the success of its predecessor, Adroit 2.0. With a focus on user-friendly interface and enhanced functionality, Adroit 3.0 leverages the power of Artificial Intelligence (AI) and Machine Learning (ML) to deliver unparalleled efficiency and simplicity.

Key features of the advanced mobile application are structured reports, Vahan integration, user-friendly interface, vernacular language support, business opportunities and advanced geo-location. The application offers user to effortlessly perform inspections and valuations across all kinds of used construction equipment, streamlining processes and boosting productivity. As the preferred choice in India's inspection, valuation and verification industry, Adroit 3.0 sets a new standard for excellence and innovation.

CRM and insights portal

In the used construction equipment industry, customer relationship management (CRM) plays a pivotal role in fostering lasting relationships with clients and optimising business processes. SAMIL, with a robust CRM system can efficiently manage customer interactions, streamline sales processes, and provide personalised services. By capturing and analysing customer data, our CRM platform enable businesses to gain valuable insights into customer preferences, purchasing behaviour and feedback, allowing us to tailor our offerings to meet individual needs.

Furthermore, CRM systems facilitate effective communication with customers through various channels, including email, phone calls, and social media, ensuring timely and relevant engagement at every touchpoint. Coupled with our in-house Insights portal for data-driven decisions, SAMIL leverages CRM data to make informed strategic decisions, identify market trends and forecast demand of used construction equipment across India.

Scope in the future

The future scope of AI and ML in the used construction equipment industry holds immense potential for revolutionising traditional practices and optimising operations. Leveraging AI and ML technologies, construction dynamics are undergoing a transformative shift towards enhanced efficiency, safety and

The integration of AI and ML technologies marks a significant milestone in the pre-owned construction equipment industry's journey towards efficiency and sustainability.

sustainability. With innovations such as autonomous machinery, predictive maintenance, condition monitoring, automated inspection, fraud detection and security, the industry is witnessing a paradigm shift in equipment management and performance optimisation.

AI-driven predictive maintenance enables early detection of issues and condition-based monitoring, ensuring proactive repairs and minimising downtime. Furthermore, AI facilitates data-driven decision-making, energy efficiency and cost savings through optimised resource allocation and real-time insights. As major players in the construction equipment sector embrace AI and ML technologies, the industry is poised for unprecedented growth and innovation, paving the way for a smarter, more sustainable future.

Embracing sustainability with electric CE

We at SAMIL have already been transacting electric vehicles. We are also ready now to transact AI and ML enabled construction machines through our advanced Phygital, online and offline auction platforms in the coming days.

As India's largest Phygital pre-owned marketplace, SAMIL remains at the forefront of innovation, offering comprehensive solutions to meet the diverse needs of the construction equipment industry. With a robust infrastructure spanning 120+ automalls nationwide, SAMIL provides unparalleled opportunities for buyers and sellers, facilitating seamless transactions through physical, online and Phygital bidding modes. Backed by CarTrade Tech and Shriram Finance, SAMIL continues to set new benchmarks for transparency, efficiency and customer satisfaction.

Embracing the future

The integration of AI and ML technologies marks a significant milestone in the pre-owned construction equipment industry's journey towards efficiency and sustainability. As we embrace these transformative innovations, we propel the industry towards greater productivity, cost-effectiveness, and environmental stewardship. This is just the beginning of a technological revolution that will shape the future of construction in India and drive us towards unparalleled heights of success. As we strive to become better than yesterday, let us embark on this journey of innovation and progress with unwavering determination and resolve.

ABOUT THE AUTHOR:
Sameer Malhotra is Director and CEO of Shriram Automall. With over three decades of experience, he has built a strong foundation for the company in 2011 His leadership has driven Shriram Automall India as India's largest Phygital marketplace for pre-owned vehicles equipment. Malhotra has introduced the concept of physical auction of used vehicles and equipment in India by establishing 130 automalls across the country.

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PREDICTIVE MAINTENANCE: A NEW PARADIGM IN HEAVY EQUIPMENT

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Predictive maintenance can help fleets avoid breakdowns while reducing maintenance costs by predicting when parts will fail based on performance data and other information.

In the day-to-day operations of heavy equipment, maintenance is the most accessible point to overlook. It is observed that there is always negligence in oil changes, brake system maintenance, and other vital checks and maintenance tasks. However, if you fail to maintain your vehicles, it directly impacts productivity. Timely and quick maintenance is a crucial factor in off-highway equipment. Trucks and equipment used in the construction and mining industry are expected to operate 24/7 at remote locations. Sometimes higher procurement costs and monetary limitations make it difficult for fleets to optimise operations and productivity. Extreme environmental conditions create havoc on fleets if they are not regularly maintained. In the event of a breakdown, fleet owners could incur high costs, which take substantial time and effort to repair.

Predictive maintenance can help fleets avoid breakdowns while reducing maintenance costs by predicting when parts will fail based on performance data and other information. However, this data-driven solution is still in a nascent stage, and questions about monetary investments, integration, and other issues must be answered before a widespread shift in industry practices can occur. Predictive maintenance is a part of digitisation, which can even help in vehicle-to-vehicle and vehicle-to-cloud connectivity. The connected

vehicles utilise advanced automation technologies and hardware such as modular controls, sensors, and I/O systems, equipped with condition monitoring functions bringing all kinds of new functionality to drivers, operators, and fleet owners.

Gain the benefits of predictive maintenance

There is a substantial monetary investment associated with maintenance, but it saves far more than the investments over time. Heavy vehicles which are adequately maintained run more efficiently with lowering fuel and maintenance costs. It also suffers fewer on-site breakdowns, which lead to costly delays. The benefits of predictive maintenance are substantial! Many manufacturing setups have already realised its importance and employed this Industrial IoT (IIoT) solution to maintain optimal product quality, improve equipment reliability and increase overall efficiency. Industrial IoT is opening new doors in terms of accuracy and efficiency for companies regarding predictive maintenance.

Reduced costs: Predictive maintenance solution can maximise vehicle efficiencies and help to forecast the areas of cost savings which are often unnoticed or takes too much time to trace through traditional paper-based maintenance practices.

Integration of predictive maintenance solutions doesn't cost much, but unexpected repairs and

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replacements can be expensive. Engine and other components don't fail without reason. Neglect maintenance gives way to minor problems developing, which can become significant with continued neglect of vehicle maintenance.

The cost-saving benefits of predictive maintenance solutions are numerous. The solution provides the flexibility of a desktop app that can collate and update real-time information of vehicle and paper-based administrative work can be reduced, and productivity of the vehicle increases by creating more time to complete tasks. Predictive maintenance solution provides a huge database with many tools and reporting, which can help detect vehicle failures and improve efficiency. In a way, vehicle maintenance extends the engine's longevity and other components and reduces the need for an early replacement. Thus, it helps in reducing repair costs as well.

Extend the life of vehicle: Integration of the predictive maintenance solution can help prevent costly repairs of the cooling system, transmission system, drivetrain, and many other components. Preventive care reduces the wear and tear of the engine that extends the life of the vehicle.

Increased safety: A vehicle breakdown at a remote location or in mines can be a dangerous situation. A driver or maintenance team never predicts what may happen when the vehicle is stranded. Condition monitoring treads of tires and air pressure is essential for vehicles.

Choosing the best in predictive maintenance

The modular X90 control and I/O system can now be equipped with condition-monitoring functions. Problems can be detected in their early stages and corrected before they result in unplanned downtime. Condition-based predictive maintenance can maximise machine availability and save the considerable cost of outages and arbitrary service calls. The X90 module allows operators to monitor the status of mobile equipment continuously. The results help determine exactly which components require maintenance and when.

B&R's X90 control system has integrated safety technology.

Typical applications include continuous monitoring of rotating parts such as hydraulic assemblies, belts, gears, and motors. The processed sensor data is also available for further use in the application. GPS monitoring has become a standard feature on many construction vehicles. Not only does this allow them to be located, but it also makes it possible to track their movement and record their hours of operation. Many large mines are situated in very remote areas and are difficult to monitor from a company's central control base. In such cases, GPS can provide information on failed vehicles on the field so that nearby vehicles can move to help resolve the failures to minimise downtime.

B&R's X90 control system has integrated safety technology. Intelligent safety functions and extremely short response times are the keys to a whole new realm of possibilities for the safe operation of outdoor equipment and mobile machinery. B&R provides a variety of TÜV-certified safety functions. The task of safety programming itself involves little more than simply configuring and linking the safe software blocks via a ladder diagram. This reduces the complexity, workload and time required for certification. All products in the X90 mobile family are designed for use in harsh industrial environments. They can handle operating temperatures from -40 to +85°C and are resistant to vibration, shock, salt, UV light, and oil. Adherence to specific industry standards for agriculture, forestry, construction, and municipal vehicles ensures maximum flexibility when using mobile automation products. In addition, the X90 mobile control system also carries numerous certifications.

Future outlook

The available solutions for predictive maintenance and digitalisation make it easy for fleet management companies to stick to a suitable maintenance schedule. It brings incredible benefits. Just by integrating the predictive maintenance solution, one can keep several vehicle problems at bay. Preventive measurements reduce the wear and tear of the engine and other components that extend the vehicle's life.

ABOUT THE AUTHOR:

Himanshu Sharma is Head – Marketing and Corporate Communication at B&R Automation.

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ADVANCING INDIAN **VITAL CONSTRUCTION WITH AI**

With AI, construction equipment can do more than ever before. They can also do some tasks on their own, which saves time and makes things safer on construction sites.

Scan to read

The construction industry in India is changing very fast because of new technologies and creative ideas. One big change is Artificial Intelligence (AI), which is making a big difference in how construction equipment is made, used, rented and maintained. AI is like a super tool that helps make things smarter, faster and safer. With AI, construction equipment can do more than ever before. They can also do some tasks on their own, which saves time and makes things safer on construction sites.

Another thing about AI in construction is that it can help predict when machines might break down. This means we can fix them before they stop working, which keeps projects running smoothly and saves money in the long run. AI also helps with planning and managing construction projects by BIM technology. This makes projects more efficient and helps them stay on track.

Overall, AI is changing the construction game in India. It's making things faster, safer, and more efficient. As more companies use AI in construction, we can expect even more exciting changes in the future.

Predictive maintenance

A big advancement in AI-powered construction equipment is called predictive maintenance. With the help of AI and special computer programmes, companies can now predict when machines might break down before it happens. This means less time wasted fixing things and more time getting the job done. In India, companies are starting to use sensors (both wired and wireless) and special software to keep an eye on equipment health in real-time. This helps them fix problems before they get big, making machines last longer and work better. With that all the other processes ERP, CRM are digitised, daily log sheets are also automated for easy and smooth operations.

Autonomous operation

Another ground-breaking innovation is the development of autonomous construction equipment. AI-powered algorithms enable excavators, bulldozers, rollers and other heavy machinery to operate autonomously, performing tasks with precision and efficiency. In India, construction companies are exploring the use of autonomous equipment for tasks such as excavation, grading, and material handling, leading to improved productivity, safety, and cost-effectiveness on construction sites.

Autonomous application may take some more time in India as to adapt Indian site environment. In material handling, already a few autonomous machines are working.

Robots and drones

Robots and drones with AI are changing how construction works in India. Robots can do repetitive tasks like operating a forklift or pouring concrete, which saves money on labour and makes projects go faster. Drones with special cameras and sensors are used to check on construction sites, track progress, and make sure everything is done right. This gives managers and others real-time updates on how things are going. Drone technology is picking up pace in India due to latest government initiatives. Many start-ups are now playing a big bet on drones and robots businesses.

AI-powered Building Information Modeling (BIM) platforms are changing how construction projects happen in India. BIM software, powered by AI, can look at huge amounts of data and make 3D models that show how a project will be built. This helps everyone involved see what the project will look like, find any problems before they happen, and make sure everything goes smoothly and accurately.

Examining the benefits of integrating AI and Machine Learning (ML) into construction equipment for optimal performance is vital in today's dynamic industry landscape. By leveraging AI and ML capabilities, construction companies and Equipment rental companies can realise several advantages:

Optimised equipment performance: By scrutinising data from sensors and equipment telemetry, AI and ML algorithms optimise equipment settings and operations for maximum efficiency and performance.

Enhanced predictive maintenance: AI and ML algorithms can assess equipment data to forecast potential breakdowns before they happen. This proactive approach minimises downtime, repair expenses, and ensures equipment operates at its best.

Improved operational efficiency: AI-driven systems automate repetitive tasks by task management software, optimise resource allocation, and streamline workflows. This boosts productivity, minimises labour costs, and speeds up project completion.

Optimising safety: AI-powered sensors and cameras detect hazards on construction sites in real-time, alerting workers to potential dangers and preventing accidents. ML algorithms analyse historical safety data to identify trends and develop proactive safety measures.

Effective decision making: AI and ML technologies empower construction firms to make decisions based on real-time insights and predictive analytics. This enhances project planning, risk management, and overall project performance.

Cost savings and budgeting: Through reduced downtime, optimised equipment utilisation, and minimised errors, integrating AI and ML can lead to significant cost savings throughout construction projects.

Skilling and training: Construction personnel require training in AI and ML technologies to effectively utilise and maintain AI-driven equipment. Investing in workforce development and providing ongoing training programs is vital. Metaverse online skill training is a rising trend all across the world and in India.

Technology integration: Collaborating with technology providers and equipment manufacturers is necessary to integrate AI and ML into existing construction equipment. Addressing issues and system integration challenges is essential for seamless and smooth operation.

Regulatory frameworks: Navigating regulatory frameworks and legalities related to data privacy, intellectual property rights, and liability is essential when implementing AI and ML solutions in construction equipment.

In summary, the exploration of the feasibility and advantages of integrating AI and ML into construction equipment offers substantial opportunities to improve performance, efficiency, and safety within the construction sector. Through thorough assessment of technological, organisational, and regulatory considerations, construction companies and rental companies can effectively leverage AI and ML to foster innovation and attain optimal results in their projects.

AI holds substantial potential in predictive maintenance, offering avenues to enhance efficiency and minimise downtime across various industries. Through the analysis of extensive data collected from sensors and equipment telemetry, AI algorithms can identify patterns and trends indicative of impending equipment failures. This enables prompt maintenance actions to be taken before breakdowns occur, thus averting unplanned downtime and mitigating disruptions to operations.

Moreover, AI-driven predictive maintenance has the capacity to prolong equipment lifespan by detecting and addressing issues early on, before they escalate into more severe problems. By addressing maintenance needs proactively, AI contributes to the reduction of both the frequency and severity of equipment failures, ultimately yielding cost savings and heightened reliability. Unskilled operators are ruining high capital equipment by not adhering the right protocols and maintenance hence it's important to adapt AI and ML.

Furthermore, AI-powered predictive maintenance systems can optimise maintenance schedules and resource allocation, ensuring that maintenance tasks are executed at optimal times to minimise interference with production schedules. This results in heightened equipment uptime and enhanced overall efficiency.

Conclusion

In conclusion, AI-driven construction equipment is ushering in a new era of innovation and efficiency in India's construction sector. From predictive maintenance and autonomous operation to robotics, drones, BIM, and smart materials, these technologies are reshaping the way construction projects are planned, executed, and managed. By embracing AI-driven solutions, Indian construction companies can overcome challenges, drive productivity gains, and deliver projects faster, safer, and more cost-effectively, positioning the industry for sustained growth and competitiveness in the global market.

ABOUT THE AUTHOR:

Satin Sachdeva is Secretary General of Construction Equipment Rental Association.

ROLE OF AI IN EV COMPONENT MANUFACTURING

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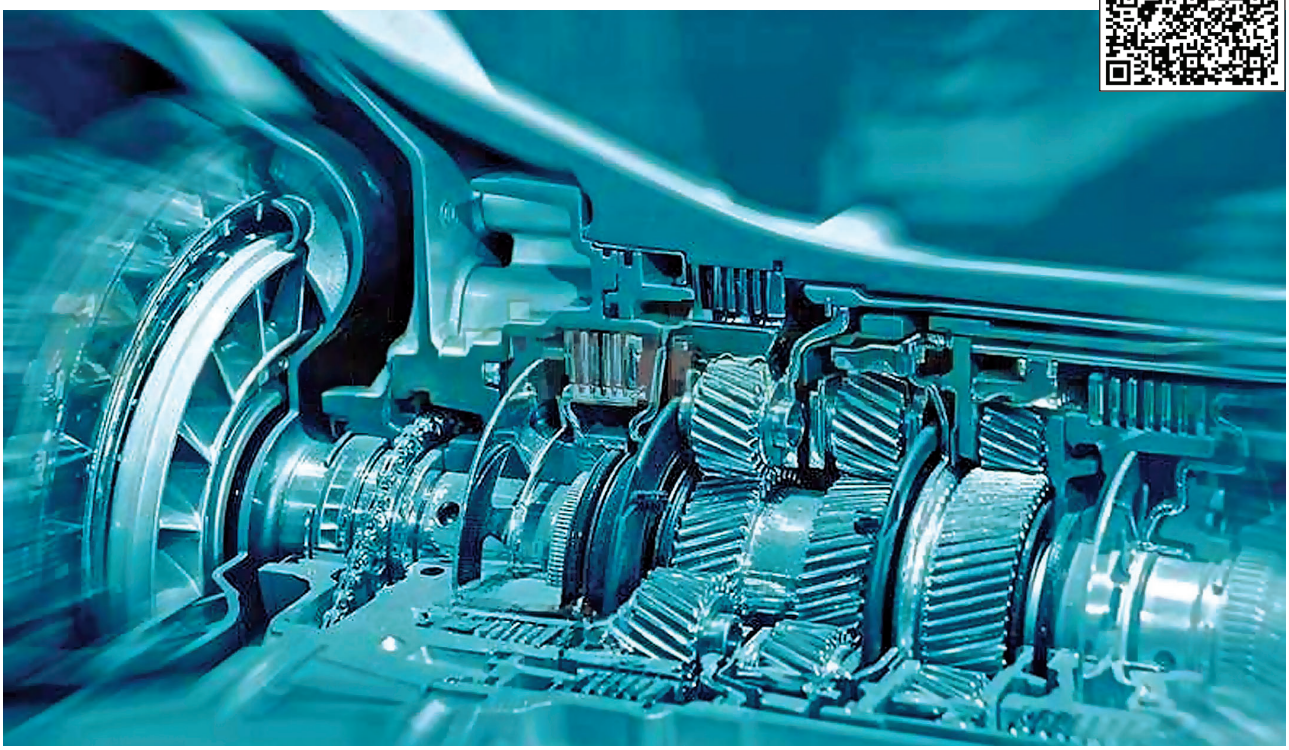


AI is gaining momentum as a pivotal component of the automotive sector, with its significance growing steadily each day.

Transportation is now cleaner and more sustainable thanks to the massive transformation electric vehicles have brought about in the automotive sector. In a similar vein, switching to electric cars is essential to lowering air pollution and combating climate change. Artificial Intelligence (AI) integration with EV systems is necessary to enable the transition. Electric vehicles come in different varieties, including fuel cell electric vehicles (FCEVs), battery electric vehicles (BEVs), and hybrid electric vehicles (HEVs). Regarding performance and manufacturing, each variety presents particular advantages and difficulties.

Undoubtedly, AI is gaining momentum as a pivotal component of the automotive sector, with its significance growing steadily each day. The automotive AI market, valued at $2.54 billion in 2021, is projected to surge at a compound annual growth rate (CAGR) of 21.6 per cent from 2022 to 2030.

Electric vehicles not only have zero tailpipe emissions, but they also have a much lower cost of ownership when compared to traditional ICE-powered vehicles. Electric vehicles are less expensive to purchase than petrol or diesel vehicles, and they are also easier to maintain. This is because electric vehicles require fewer components than conventional vehicles.

The main components of an electric vehicle are the battery pack, power control unit, electric motor, gearbox, and battery charger.

There are various types of electric vehicle such as:

- A tiny battery pack, an electric motor, and an internal combustion engine are all combined in a hybrid electric vehicle (HEV). Fuel consumption

and emissions are decreased by the electric motor's assistance to the engine during acceleration and other driving conditions. Battery electric vehicles (BEVs) run exclusively on electricity and store energy in rechargeable batteries. Compared to battery-powered EVs, fuel cell electric vehicles (FCEVs) have longer power ranges because they generate electricity using hydrogen fuel cells.

- In the world of electric vehicles, AI is revolutionising the field by spurring innovation and improving efficiency. By enhancing battery performance and refining energy management techniques like range prediction and charging infrastructure, AI is transforming the battery industry. These developments are fuelling the increasing use of electric vehicles and their increased efficiency.
- The advancement and expansion of electric vehicles are being influenced by AI. AI transforms how we think about and use electric cars, from battery management to autonomous driving. As technology develops, one of the most intriguing developments in the field of electric vehicles is the application of AI. An important step towards a more intelligent, sustainable, and greener future is the integration of AI into electric vehicles.

AI impact on manufacturing of EV components

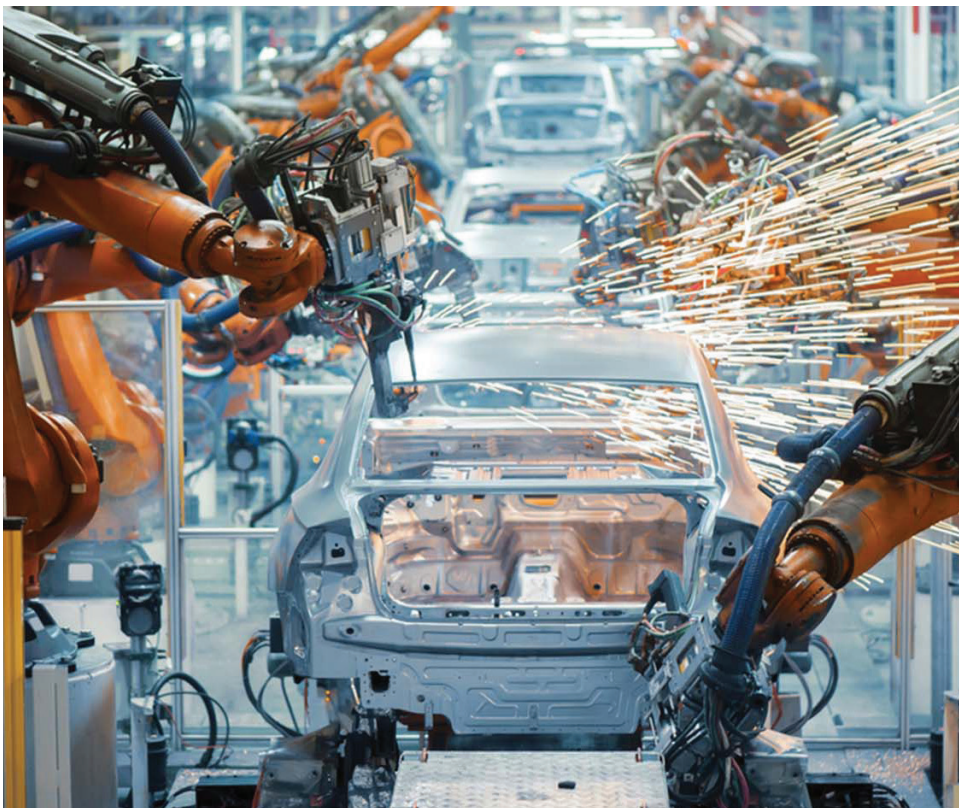
The production of batteries and assembly line operations are two areas of EV component manufacturing where AI is crucial to optimising various aspects of the process. AI is particularly good at improving the productivity and calibre of battery manufacturing processes.

Battery management systems (BMS) use AI algorithms to monitor and control vital parameters like battery performance, health, and charging cycles. AI algorithms can anticipate possible problems and optimise energy consumption by evaluating real-time data from sensors integrated into the batteries. This allows the battery packs to last longer. This guarantees EVs' long-term dependability in addition to improving their overall performance.

Within the realm of electric vehicle technology, AI is vital for autonomous driving. AI algorithms analyse information from multiple sensors, such as lidar, radar, and cameras, to understand the environment around the vehicle and make appropriate decisions. By handling driving duties, self-driving electric vehicles (EVs) can increase safety, lower accident rates, and offer convenience.

The efficiency and dependability of the infrastructure used for charging electric vehicles can be significantly increased with AI. To reduce wait times and guarantee a flawless charging experience, AI algorithms can be used to optimise charging station locations, forecast demand patterns, and control the charging process. AI can also facilitate communication between EVs and the grid, enabling them to act as energy storage and take part in energy balancing.

Through predictive maintenance algorithms, AI is also revolutionising electric vehicle maintenance procedures. These algorithms detect possible problems before they become failures by analysing real-time data from the vehicle's components. AI makes proactive maintenance possible, minimises downtime, and improves vehicle performance by identifying anomalies and forecasting



maintenance requirements.

Additionally, manufacturers can detect possible anomalies or faults in battery components before they become expensive failures thanks to AI-driven predictive maintenance techniques. Manufacturers can maximise production efficiency and reduce downtime by proactively addressing these issues.

Future applications of AI include automated highway systems. Advanced infrastructure, such as specific lines on highways, that help vehicles stay in the lane. AI is expected to become less expensive as it is used more widely. This could help EVs become more affordable for a wider range of people.

AI could help reduce the number of gas-powered vehicles on the road by making electric vehicles more affordable and appealing to consumers.

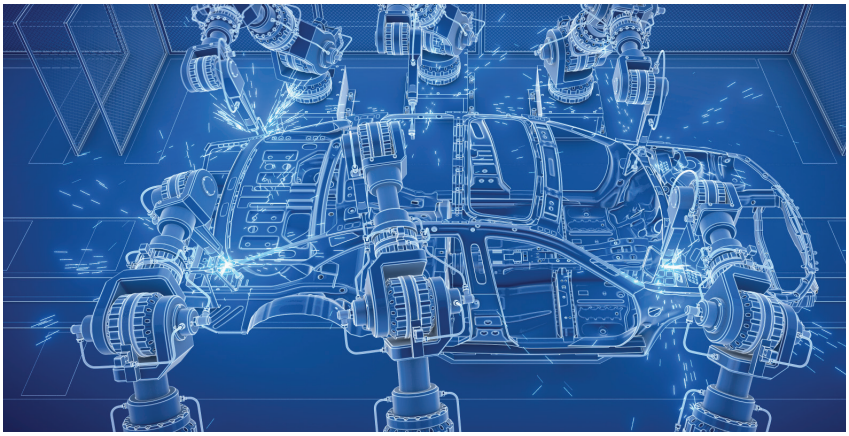
Benefits of electric vehicles

Electric vehicles have the potential to significantly reduce greenhouse gas emissions and air pollution, making them an attractive solution to environmental pollution. Adoption of electric vehicles provides us with a significant opportunity to reduce pollution. Adopting EVs allows us to significantly reduce greenhouse gas emissions, improve air quality, use renewable energy sources, and promote transportation sustainability.

Challenges in the integration of AI

Initial investment costs: A sizable upfront investment in technology infrastructure, hardware, and personnel training is necessary for the implementation of AI-driven automation systems. These expenses may be unaffordable for small and medium-sized manufacturers, which would hinder adoption.

Workforce adaptation and reskilling: As automation grows, worries about job displacement and the need for workforce reskilling are bound to arise. Workers need to adjust as traditional manufacturing roles change to efficiently operate, monitor, and maintain AI-powered systems. A thorough training programme must be funded to close the skills gap and guarantee a seamless transition for staff members.



Data security and privacy issues: As AI and automation proliferate in the manufacturing sector, new data security and privacy issues arise. Since AI systems are gathering and analysing sensitive production data, manufacturers need to put strong cybersecurity measures in place to protect against possible breaches and unauthorised access.

Integration with legacy systems: A lot of manufacturing facilities use outdated software that might not work with the latest automation and AI innovations. Technical difficulties and careful planning are involved when integrating new systems with the current infrastructure to guarantee smooth interoperability without interfering with current operations.

The use of AI and automation in EV component manufacturing has the potential to revolutionise vehicle production, bringing unprecedented levels of efficiency, precision, and sustainability to the industry. However, realising the full potential of these technologies necessitates addressing a wide range of challenges, including initial investment costs, workforce reskilling, and ethical concerns. Electric vehicles have the potential to significantly reduce greenhouse gas emissions and air pollution. The widespread adoption of electric vehicles has enormous potential to reduce environmental pollution. To meet the charging demand for its electric vehicles, India may need more than four million charging stations by 2030.

As manufacturers embark on this transformative journey, collaboration among industry stakeholders, policymakers, and technology providers is critical to overcoming obstacles and unlocking the transformative power of AI and automation in driving the future of electric mobility. By embracing innovation while adhering to principles of sustainability and inclusivity, the automotive industry can pave the way for a brighter, more efficient, and sustainable future powered by electric vehicles.

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Bharath Rao is Founder and CEO of Emobi, a Bengaluru-based electric vehicle (EV) pioneering start up specialising in EV design, frugal-engineering methodologies, and lean manufacturing processes across a diverse range of electric vehicles.

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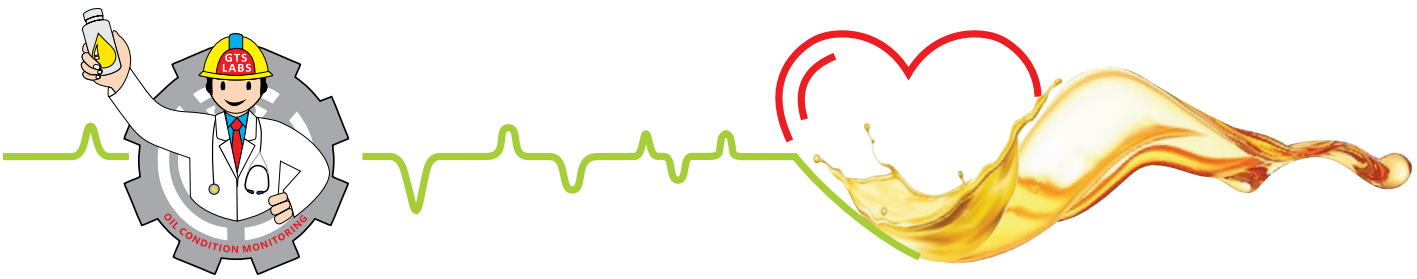

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OIL IN MACHINE IS LIKE BLOOD IN THE HUMAN BODY

CHANGING THE **FUTURE OF CONSTRUCTION**

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In construction, machine learning can help project engineers, supervisors, and everyone else involved in a project.

It has always been our goal to build technologies that mimic human intelligence. That's why Machine Learning and AI are at the centre of today's industries, ready to turn their aspirations into realities. As a subset of artificial intelligence, machine learning relies on unique statistical algorithms that run on data without the need for explicit programming or human assistance.

Intelligent behaviour requires extensive information or knowledge, so machine learning is one implementation of artificial intelligence. AI in construction consists of two main areas – deep learning and machine learning. In spite of its nascent stage, the technology has applications in structural health monitoring, assessing building materials, safety on construction sites, and predicted energy demand. Deep learning is a subfield of machine learning that heavily relies on neural networks.

Machine learning enables various machines to learn and predict results on their own. Machine learning enables. Instead of having a person program them, they use algorithms and software to make predictions based on data. Without any manual examination, machines can notify you about preventive maintenance or updates.

AI in construction has the potential to help players realise value throughout project lifecycles, including design, bidding, and financing; procurement and construction; operations and asset management; and, business model transformation. AI in construction helps the industry as a whole overcome some of our toughest challenges, including safety concerns, labour shortages, and cost and schedule overruns.

In construction, machine learning can help project engineers, supervisors, and everyone else involved in a project. ML can help monitor the work progress, assess the risks involved, notify the managers and supervisors of critical issues, improve the design and planning activities, and make informed predictions for a more streamlined workflow.

Construction safety

It is very common in the construction industry for workers to get drastically injured or have life-threatening accidents on the job, as compared to labourers from any other industry. The implementation of ML at sites can upgrade the level of safety. It can be used to assess, identify, and promptly report any glitch perceived. ML can be used in visual and audio data emerging from a construction site for recognising safety threats and carrying safety updates to eradicate elevated hazards. The adoption of ML on construction sites can take the level of safety to new heights. It can be used to identify, assess, and instantly report any anomaly detected.

Limit cost overruns: Construction projects, undoubtedly, have big budgets and are high on expenses. Most of the time, such projects go over budget despite predicting all kinds of expenses. In such cases, Artificial Neural Networks work on projects to forecast cost overruns. The factors taken into consideration are contract type, project size, and the competency of project managers. AI helps the workforce access real-life training material remotely, which enables them to enhance their skills and knowledge swiftly.

Better designs: Machine learning can advance designs to make spaces superior for their eventual end-users. Likewise, machine learning can help workers identify errors and blunders in the design before going forward with building. Instead, you can leave that to machine learning which ultimately saves team's critical times that can be used for more productive tasks. With machine learning, you can even test various environmental conditions and situations in the model. The technology can help to determine if a particular element of the design is optimal, or can predict if it could create an issue down the road.

Increase in productivity: Construction projects are more productive when ML software is used. Using the software solutions, users can monitor and supervise daily operations on sites such as concrete pouring, bricklaying, electrification, flooring, plumbing works, and roofing. Additionally, project managers can track job site work in real-time. To assess worker productivity and compliance with procedures, they use facial recognition, onsite cameras, and similar technologies.

Risk mitigation: Construction projects are not without risk in many forms, such as safety, time, quality, and cost risks. Larger projects entail more risk since different subcontractors work simultaneously on different trades. Contractors today use AI and Machine Learning solutions to monitor risk on the job site so that the project team can focus their time and resources on other crucial factors. AI can be used to routinely assign priority to concerns. Risk scores are assigned to subcontractors so that construction managers can work closely with high-risk teams to mitigate risk.

Increase project's lifecycle: Besides construction and design, machine learning may even prove useful in facility management to extend an asset's overall lifecycle. Facilities management generally lacks important information. Therefore, it is difficult to manage on-site repairs and renovations efficiently and cost-effectively. Through the collection and utilization of information and data, machine learning can assist in streamlining the process. Documents and data, like work orders, can be classified and relevant conditions analysed in real-time, with surprising accuracy. By doing so, the administrative burden is taken off of people, who can focus on the real problem at hand.

AI and Big Data in construction and post-construction

AI systems now have access to an endless amount of data for learning from and improving on every single day in an age when an endless amount of data is being created every day. AI becomes a data source from every single job site. A vast body of information has been collected from images and videos captured using mobile devices, drones, security sensors, and building information modelling (BIM). Artificial intelligence (AI) and machine learning provide construction industry professionals and customers with the opportunity to analyse data and gain insights from using the data.

The use of sensors, drones, and other wireless technologies to collect information about buildings, bridges, roads, and everything in the built environment helps advanced analytics and AI-powered algorithms gain valuable insight. By this logic, AI can monitor arising problems, determine when preventative maintenance is needed, and even guide human behaviour to achieve the best security and safety results.

ABOUT THE AUTHOR:

Snehal Sharma from ESDS Software Solution. The company provides a comprehensive range of solutions, which provides a "one-stop- shop" for its customer's cloud adoption.

PAVING THE WAY FOR OPTIMAL PERFORMANCE

As L&T continues to navigate the crossroads of innovation and sustainability, integrating AI and ML in construction equipment stands out as a beacon of progress.

The landscape of the construction industry has been undergoing a remarkable transformation, largely thanks to the integration of Artificial Intelligence (AI) and Machine Learning (ML) into construction equipment. This fusion of technology and heavy machinery promises not only to enhance efficiency but also to revolutionise the way infrastructure projects are undertaken. Seventy-five years ago, the leaders of L&T foresaw India's potential as a superpower, recognising that accelerated growth in infrastructure was key. L&T Construction & Mining Machinery (CMB) continues this legacy today, focusing on sustainable next-generation technologies, including AI, ML, robotics, and e-vehicles.

The Feasibility and Advantages of Incorporating AI and ML

The feasibility of incorporating AI and ML into construction equipment has been demonstrated by Komatsu, which is at the forefront of developing remotely operated mobile units, autonomous haulage vehicles, and customised attachments for specific industrial applications. These

innovations are not just theoretical but are being applied in real-world scenarios, showcasing the tangible benefits of digitalisation in construction and across mining sites.

AI and ML technologies enable construction equipment to operate with greater precision and efficiency. For instance, autonomous haulage vehicles can navigate complex mining sites safely, reducing the risk of accidents and ensuring uninterrupted progress. Similarly, machine telematics, exemplified by L&T DigiEye, allow for real-time tracking of machine parameters and location, facilitating optimal performance and reducing downtime.

Predictive Maintenance: A Game-Changer

One of the most significant advantages of AI in construction equipment is its potential for predictive maintenance. By analysing data from equipment sensors, AI algorithms can predict when a machine is likely to fail or require maintenance, allowing for intervention before costly breakdowns occur. This predictive capability not only minimises downtime but also extends the lifespan of the equipment, resulting in significant cost savings and improved project timelines.

Reducing Carbon Footprint and Enhancing Sustainability

In the current global context, marked by a pandemic and heightened environmental awareness, L&T CMB's focus on reducing carbon footprints and enhancing resource efficiency is more relevant than ever. The integration of AI and ML in construction equipment plays a crucial role in achieving these sustainability goals. By optimising the operation of machinery, these technologies ensure that energy consumption is minimised and emissions are reduced, contributing to the overall sustainability of construction projects.

Moreover, L&T's commitment to Environmental, Social and Governance (ESG) parameters, including efforts in afforestation and biodiversity, underscores the company's holistic approach to sustainability. Incorporating AI and ML in construction equipment aligns with these efforts, demonstrating how technological innovation can complement and enhance environmental stewardship.

As L&T continues to navigate the crossroads of innovation and sustainability, integrating AI and ML in construction equipment stands out as a beacon of progress. These technologies promise to enhance the efficiency and safety of construction projects and align with broader sustainability goals, offering a glimpse into the future of infrastructure development. The journey that began seventy-five years ago continues, with AI and ML leading the way towards a more efficient, safe, and sustainable construction industry.

ABOUT THE AUTHOR:
Arvind K Garg is Senior Vice President & Head, L&T Construction & Mining Machinery, one of the leading construction machinery manufacturers in India.

MACHINES MADE SMARTER

Construction equipment equipped with AI can detect the presence of objects or workers in its vicinity and automatically adjust its operations to ensure safety.

Scan to read

In recent years, the construction industry has witnessed significant advancements in technology. One of the most notable breakthroughs is the integration of artificial intelligence (AI) in construction equipment. This innovative approach has revolutionised the way construction activities are carried out, making machines smarter and more efficient. But what exactly is the role of AI in construction equipment, and how is it transforming the industry?

Before delving into the specifics of AI in construction equipment, it is important to understand the basics of artificial intelligence itself. AI refers to the development of intelligent machines that can perform tasks that typically require human intelligence. These machines can learn, reason, and make decisions based on the information they receive.

Given the complexity of construction activities, the integration of AI in construction equipment brings numerous benefits. AI enables construction machines to analyse data, identify patterns, and make real-time adjustments, resulting in improved productivity and accuracy. This technology enhances the overall performance and capabilities of

construction equipment, making it smarter and more efficient.

Artificial intelligence is a rapidly evolving field that has revolutionised various industries, including healthcare, finance, and transportation. In recent years, the construction industry has also started to embrace AI technology, recognising its potential to transform construction equipment and processes.

At its core, artificial intelligence is based on the concept of machine learning. Machines are programmed to learn from data and adapt their behaviour accordingly. This iterative learning process enables AI-powered machines to constantly improve their performance and make informed decisions.

The evolution of AI in construction equipment is not a recent development. It has been an ongoing process, with continuous advancements in technology. Initially, AI was primarily used for data analysis and predictive maintenance. Over time, however, AI has become more sophisticated and capable of performing complex tasks.

Today, AI in construction equipment is involved in various aspects of construction activities, such as surveying, planning, and even operating heavy machinery. The evolution of AI in construction equipment has paved the way for increased efficiency and accuracy in construction processes, ultimately leading to cost savings and improved project timelines.

AI has the potential to revolutionise the construction industry by enhancing the capabilities of construction equipment. With AI integration, machines can now analyse vast amounts of data in real-time, enabling them to optimise their performance and adapt to changing conditions.

For example, AI-powered construction equipment can autonomously adjust their parameters based on the nature of the terrain, weather conditions, and workload. This eliminates the need for constant manual intervention, allowing operators to focus on other critical tasks that require human expertise.

The integration of AI in construction equipment brings forth a multitude of benefits. Firstly, it improves the accuracy and precision of construction activities, minimising errors and rework. This leads to cost savings and enhances the overall quality of the constructed infrastructure.

Additionally, AI integration enables predictive maintenance, reducing downtime and improving machine reliability. By analysing real-time data, AI-powered machines can identify potential issues and schedule maintenance before any major breakdowns occur.

The applications of AI in construction equipment are vast and diverse. From autonomous vehicles that can transport heavy materials to drones that can survey large construction sites, AI is revolutionising the way construction projects are executed.

Moreover, AI-powered construction equipment can perform complex tasks with precision, such as bricklaying and concrete pouring. These machines can receive instructions digitally and execute them flawlessly, avoiding human errors and streamlining the construction process.

To further understand the potential of AI in construction equipment, let's explore some real-world case studies. Several construction companies have successfully implemented AI technology in their equipment, reaping significant benefits.

For instance, a large construction firm used AI-enabled drones to survey a vast construction site. This allowed them to obtain accurate topographical data and identify any potential obstacles before commencing construction. This not only saved time and resources but also ensured the project proceeded smoothly.

Maintaining construction equipment is essential to ensure smooth operations. With the integration of AI, predictive maintenance has become a reality in the construction industry. AI-powered machines can monitor their own performance, detect anomalies, and predict when maintenance is required.

By adopting AI-enabled predictive maintenance, construction companies can proactively address maintenance issues, minimising downtime and optimising the lifespan of their equipment. This technology eliminates the risk of unexpected breakdowns and maximises productivity on construction sites.

Operator safety is of paramount importance in the construction industry. AI technology plays a crucial role in enhancing safety measures for operators and workers. AI-powered machines can detect potential hazards and warn operators before accidents occur.

For example, construction equipment equipped with AI can detect the presence of objects or workers in its vicinity and automatically adjust its operations to ensure safety. This technology reduces the risk of accidents and creates a safer working environment for construction personnel.

Despite the numerous benefits of AI in construction equipment, there are still concerns and misconceptions surrounding its implementation. Some fear that AI-powered machines will replace human workers, leading to significant job losses.

However, it is important to note

that AI is designed to complement human workers, not replace them. While AI can automate certain tasks, it requires human oversight and expertise for optimal operations. Additionally, AI integration opens up new job opportunities in areas such as AI maintenance and data analysis.

Furthermore, addressing concerns about data privacy and security is essential when implementing AI in construction equipment. Robust cybersecurity measures should be in place to protect sensitive data and ensure the integrity of AI systems.

Successfully adopting AI in construction equipment requires careful planning and implementation. Construction companies should consider the following strategies when integrating AI into their equipment:

- Identify specific tasks or areas of construction that can benefit from AI integration.
- Partner with AI technology providers to ensure seamless integration and support.
- Train operators and construction personnel on the proper use and maintenance of AI-powered equipment.
- Regularly update AI systems and software to leverage the latest advancements and features.
- Continuously monitor and evaluate the performance of AI-powered equipment to optimise operations.
- The field of AI in construction equipment is constantly evolving. New trends and innovations continue to emerge, shaping the future of the industry. One such trend is the use of machine learning algorithms to optimise construction processes and resource allocation.

Furthermore, the integration of AI with other emerging technologies, such as virtual reality and augmented reality, holds immense potential for the construction industry. These technologies can enhance collaboration, visualisation, and simulation, leading to improved project outcomes.

As AI technology continues to advance, the future of AI-enhanced construction equipment looks promising. Predictions suggest that AI-powered machines will become even smarter and more autonomous, further reducing the need for manual intervention.

Moreover, the integration of AI with the Internet of Things (IoT) will create interconnected systems of construction equipment, enabling seamless communication and data sharing. This will result in enhanced coordination and efficiency across construction sites.

Ultimately, AI in construction equipment is set to revolutionise the industry, improving productivity, accuracy, and safety. As construction companies embrace this technological shift, they will unlock new opportunities and achieve greater success in their projects.

ABOUT THE AUTHOR:
Jordan Terry is Head of Product and Design at Vergo. Terry's focus for the last decade has been to builder better products through technology, design, and strategic thinking. His work has spanned from large digital marketing launches with companies like Verizon to creating brands and designing products for startups in Silicon Valley.

COMBINATION TYPE PASSENGER CUM MATERIAL HOIST

	CAPACITY	DIFF. CAGE LENGTHS	SPEED WITH FULL LOAD
1	3.2 Tonnes	4.0m 3.6m 3.2m	46 M/Min 46 M/Min 46 M/Min
2	2.7 Tonnes	4.0m 3.6m 3.2m	63 M/Min 63 M/Min 63 M/Min

CAGE WIDTH - 1.5m • CAGE HEIGHT - 2.35m

TECHNICAL DETAILS :

1	MAXIMUM HEIGHT	500m
2	MAST SIZE & MATERIAL	650x650x1508mm, ST52
3	MOTOR + GEAR BOX	3x15KW NORD GERMANY
4	PLC	SIEMENS GERMANY
5	VFD	2x90KW SIEMENS GERMANY
6	FLOOR SELECTOR	SIEMENS GERMANY
7	OVER LOAD DEVICE	DIGITAL
8	NUMBER OF PERSONS	38

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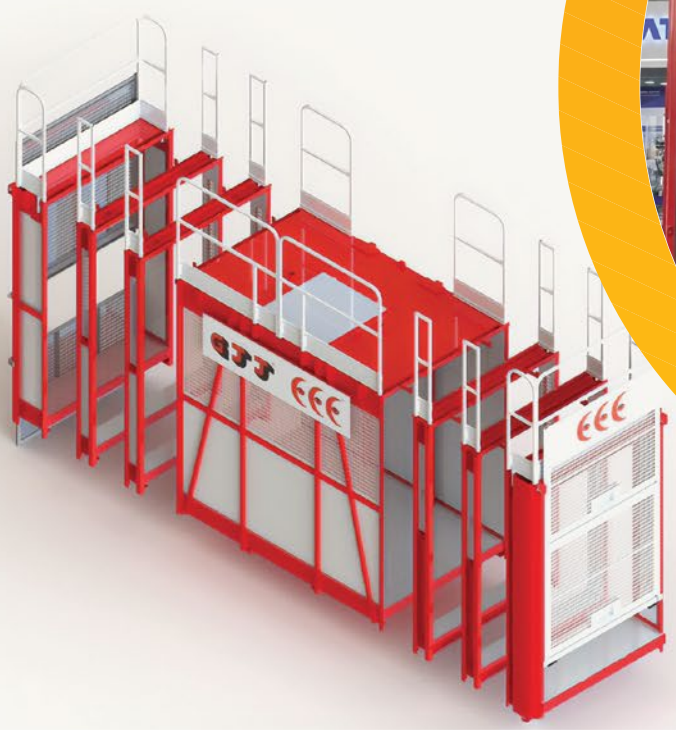

THE FUTURE OF CONSTRUCTION

Some construction machines such as autonomous excavators or dozers are able to perform certain pre-programmed tasks autonomously.

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Artificial intelligence and its continuous development affect all the different sectors of industry. One of the branches that can take advantage of artificial intelligence is the construction industry. The most important subsection of artificial intelligence for the construction sector is actually machine learning: IT systems are able to find solutions for problems by pattern recognition in databases. That implements that the AI system has to be "trained" and needs a lot of data before it can work properly. With the release of ChatGPT and similar models of artificial intelligence, it might also become possible to have intelligent chatbots on construction machines.

What for can artificial intelligence be used on construction machines and what advantages does this bring with it?

Higher productivity and efficiency: Using artificial intelligence on construction machines can optimise work processes and rise efficiency. AI systems can work as virtual assistant and deliver helpful information in real-time to the operator. From monitoring the machine status up to optimising workflows, artificial intelligence can contribute to rise productivity and reduce waste of time and resources.

Predictive maintenance and fault detection: One of the main challenges of the construction industry is to

minimise machine breakdowns and prevent cost-intensive repair works. Equipping construction machines with sensors, that continuously collect and analyse data can be connected to AI technologies. Thus, potential problems can be detected in an early status and the info can be sent to the operator to avoid breakdowns. That results in minimised downtimes and extended machine lifetime.

Higher Safety: Safety – another major priority on construction sites can also be improved using AI. It could for example be used as voice control system in a way that the operator is giving instructions without taking his hands off the machine control sticks or steering wheel. AI can also warn the operator if there are potential dangers or risky situations.

Improved planning and decision-making: Analysing big data means that AI can deliver important insights that can help improving planning and decision making. AI can for example use historical data, weather information, project data and other relevant information to give more precise forecasts and recommendations. That helps using resources more efficiently, optimise timetables and leads to better results.

An example is process management: The AI system can identify deviations from the plan and with the information of the digital data management, AI can better forecast the needs for further sections and thus optimise the whole process.

Conclusion

Using artificial intelligence on construction machines offers a lot of potential to change construction industry from the ground. From a higher efficiency over predictive maintenance up to higher safety and facilitated decision-making - there are many advantages.

Up to now, AI is mostly used for analysing and processing big data amounts with algorithms. The results are used for optimising, more efficiency and savings in the construction sector. There are already construction machines that can drive (semi) autonomously today. These technologies are constantly developing and are already being used in some areas.

Some construction machines such as autonomous excavators or dozers are able to perform certain pre-programmed tasks autonomously. They can detect obstacles, scan their environment and adjust their movements ccordingly to work safely and efficiently. This type of autonomous construction machinery is often used in controlled environments such as mines or construction sites where working conditions are highly predictable. It remains exciting to see how these technologies will develop further and which innovations the future will bring in this sector. But of course it is also important not to lose sight of the ethical questions when using AI and we should also keep in mind, that these systems can never replace human mind.

Article courtesy:
Moba Corporation

AI'S POTENTIAL AS **VITAL CONSTRUCTION TOOL**

The construction industry is ripe for further AI adoption – and innovative equipment OEMs are leading the charge.

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Artificial Intelligence (AI) enabled technologies provide a golden opportunity for construction companies to increase efficiency across their entire value chain as well as delivering projects faster and cheaper. The industry is |ripe for further AI adoption – and innovative equipment OEMs are leading the charge.

Construction companies have come up against the same patchwork of problems for decades, including poor productivity and profitability, inadequate planning, budget overruns and project delays. According to one recent report, less than one in three contractors finish projects on time and within budget.

These recurring challenges are often attributed to the fact that construction companies are slow to embrace new methods and technological change. Instead, they cling to more traditional ways of planning, managing and executing projects, which leads to reduced margins for the firms, and dissatisfaction among their clients.

Finally, a new age of digital enablement seems to be arriving in construction, largely driven by revolutionary developments in AI. Companies are beginning to move to the digital age, as technologies arrive that improve performance and efficiency across every part of the construction life cycle.

AI: what is it and what does it mean in construction?

AI is an overarching term for how machines can mimic human cognitive functions, such as learning, problem-solving and decision-making. Machine learning is probably one of the most game-changing innovations in AI, where statistical algorithms are used to enable computer systems to learn from data and become better at providing insights as they consume ever more of it.

Many experts agree that AI-based solutions will positively disrupt the construction industry in the next decade. By applying these tools to track and evaluate different stages of the construction pipeline, companies can improve efficiency in ideation and

The latest wave of AI sees robots and drones working alongside algorithms to detect construction problems faster.

design, streamline complex construction sequences, improve project management, boost productivity and dramatically reduce their costs.

How are companies using AI to do better business

Innovative companies in the technology space, such as nPlan, Sensat and Continuum are working to enhance virtually every cog in the construction project life cycle through AI.

In the past, architects and engineers would spend countless hours creating designs and variations that met all the functional and compliance requirements of their clients.

With generative design, all those frustrating hours are minimised. Instead of all the onerous, manual work, designers use software that is connected to a database of previously constructed buildings. They enter all the parameters for the project, such as space requirements, cost constraints, preferred materials and required building performance into the software. The AI-optimised tool then analyses all possible combinations and automatically generates design options that meet the specified criteria. The software learns from each new construction project, too, becoming a stronger tool with every iteration.

AI brings further opportunities to eliminate logistical inefficiencies and improve productivity during the construction process.

On sites where technological adoption is limited, up to a third of total project time continues to be spent on logistical headaches such as locating and moving materials, rearranging tasks, and the unnecessary downtime of man and machine. AI-based tools are capable of addressing all those challenges.

The latest wave of AI sees robots and drones working alongside algorithms to detect construction problems faster. Robots autonomously capture 3D scans of a site as construction progresses. The images are fed into a neural network where they're compared with the original building plans and blueprints. The AI tracks progress against the original plan and automatically identifies errors, delays, or transgressions.

When issues are flagged, the project team can react immediately, avoiding the impact of more time-consuming and costly corrections at a later stage.

The AI can even be instructed to make changes to the construction schedule based on any infraction it identifies, automatically informing all relevant stakeholders and in turn increasing the likelihood of the project being delivered on-schedule.

Construction companies are also using AI-based solutions to improve site safety, security and productivity.

For example, sites are increasingly equipped with AI-enabled sensors, cameras and other connected devices to monitor for hazards and intruders, as well as keeping track of the location of workers and equipment. The technology enables firms to have an accurate, 360-degree, 24/7 picture of their site. They can quickly spot unsafe behaviour, move man or machine where they're needed faster, and ultimately have a safer and more productive site that gets projects delivered efficiently and safely.

How is construction OEMs responding to developments in AI?

Construction machines have an essential role to play in keeping sites productive and profitable. So it's no

Construction industry OEMs also incorporates AI technologies to improve site safety.

surprise that the OEMs responsible for building mission-critical equipment are harnessing the power of AI in their applications.

Probably the most radical example of AI in action can be seen in fully-autonomous, self-driving construction vehicles, which are already being deployed to global jobsites.

These machines are designed to perform repetitive tasks more efficiently than any human. A technician simply enters the necessary specifications for the job and the machine does the rest. Current AI-enabled machines are capable of doing tasks including demolition, excavation and groundworks, pouring concrete and even bricklaying.

All of this frees workers up to focus on more technical tasks and reduces the overall time required to complete a project. While AI experts contend that the potential of autonomous vehicles can only be fully realised once super-fast 5G networks are in place, the technology is established and primed to transform the construction landscape.

Other, less invasive, but no less effective AI applications are being implemented by machine OEMs. AI-powered sensors, for example, are featured on equipment to help with overall function, operation and efficiency.

Tech in construction

Sensors can monitor all kinds of conditions relevant to a machine and the job it is doing, including temperature, engine condition, and even data about the materials the machine is working with. Captured data is combined with AI tools to provide analysis and forecast any malfunctions, problems or delays before they happen – in turn preventing costly downtime.

Sensors are also used to assist drivers on technically complex jobs – for example, providing precision in digging trenches to specific depths or improving machine maneuverability on sites where space is limited.

Construction industry OEMs also incorporates AI technologies to improve site safety. Several manufacturers enable 360-degree vision for drivers by combining cameras placed around the vehicle with the latest AI-enabled object-tracking technology. This enables the machine to detect hazards automatically and alerts the operator, as well as anyone nearby, before there's an accident.

Other manufacturers, meanwhile, are working to solve problems such as idling equipment and emissions through a variety of AI-driven methods.

What does the future look like for AI and construction?

According to even conservative estimates, autonomous machines can boost site productivity by 30 per cent while the use of AI, combined with robotics and IoT, can reduce building costs by up to 20 per cent.

These studies are difficult to ignore. So while construction has historically adopted new tech at a crawl, many observers see a tipping point coming as companies finally adopt the advanced solutions to reduce errors and overruns, improve safety, and make construction operations more efficient in a dynamic new digital age.

Article courtesy: Perkins

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RISE OF SMART FACTORIES

Collaborative robotics, virtual reality (VR), and augmented reality (AR) promote safer and more productive work environments.

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The year 2024 brings together breakthroughs in technology, the need for sustainability, and radical changes in production paradigms in the dynamic field of manufacturing. This crucial point in the industry's history indicates a significant shift towards efficiency, innovation, and sustainability. It is clear from examining the trends influencing manufacturing in 2024 that a new approach to production is being indicated by this period.

Traditional manufacturing methods are being redefined by the rise of smart factories. By 2024, these establishments will have integrated systems, artificial intelligence (AI), and the Internet of Things (IoT) in place to coordinate smooth, self-sufficient operations. These factories achieve increased efficiency and decreased downtime by optimising output through the use of adaptive manufacturing processes, real-time data analytics, and predictive maintenance.

Additive manufacturing advancements

In 2024, the field of additive manufacturing—also referred to as 3D printing—undergoes a revolution. The technique advances beyond its earlier constraints, enabling mass production of complex and robust components in addition to prototyping. Its viability across several industries is strengthened by improved printing materials and quicker printing rates, which enable on-demand, localised production and customisation.

In manufacturing, sustainability becomes a non-negotiable focal point. In 2024, companies will place a higher priority on adopting circular economy models, optimising resource utilisation, integrating renewable energy sources, and adopting eco-friendly practices. Manufacturers respond to the growing demand for environmentally conscious products by aligning their operations with sustainable development goals, which include lowering carbon footprints and adopting recyclable materials.

Manufacturing strategies are being reevaluated globally, with a growing focus on localised production and reshoring. Companies reevaluate outsourcing due to factors like supply chain interruptions, geopolitical concerns, and the value placed on agility. Closer manufacturing locations to consumer markets help manufacturers save costs, shorten lead times, and improve their ability to adapt to changing consumer demands.

Human-machine collaboration

In 2024, human-machine cooperation takes on a new

significance. The emphasis is shifting to improving the synergy between humans and machines as automation spreads. Collaborative robotics, virtual reality (VR), and augmented reality (AR) promote safer and more productive work environments. Employees are more proficient in managing, programming, and working with intelligent equipment, which boosts output quality and productivity.

As digital technology grow more integrated into daily life, cybersecurity and digital resilience become critical issues. By 2024, manufacturers will have made significant investments in strong cybersecurity defences to protect intellectual property, production systems, and sensitive data. AI-driven threat detection and response systems combined with a proactive approach to cybersecurity strengthen the sector's defences against changing cyberthreats.

The shift in manufacturing towards customer-centric production models places the era of mass customisation front and centre. Businesses can now create customised products at scale thanks to advanced analytics and artificial intelligence (AI), which gives them a detailed understanding of customer preferences. Manufacturing in 2024 responds to particular consumer requests, from personalised apparel to customised electronics, strengthening brand loyalty and creating a competitive advantage.

Biotechnology integration in manufacturing

Traditional industrial methods are disrupted by biotechnology integration in 2024. The combination of biotechnology and manufacturing is revolutionising material supply and production processes, from biofabrication for textiles to bioengineered materials. Bio-based manufacturing methods and sustainable biomaterials emerge as workable substitutes that minimise environmental effect and depend less on conventional resources.

In 2024, manufacturing will be shaped by a combination of technical advancements, sustainability requirements, and flexible approaches. This revolutionary period is characterised by smart factories, advances in additive manufacturing, sustainability programmes, reshoring activities, and the peaceful coexistence of humans and robots. Adopting these trends helps the sector move towards a more sustainable and customer-focused future while also increasing operational efficiency and productivity. These developments open the door to a reimagined and dynamic industrial landscape in the years to come as manufacturing keeps changing.

Closer manufacturing locations to consumer markets help manufacturers save costs, shorten lead times, and improve their ability to adapt to consumer demands.

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Frans Van Niekerk is Managing Director of Atlas Copco India. He leads the company's operations in India as well as Bangladesh. Niekerk is a South African citizen. His education includes studies in Accounting and Economics from Lyceum Correspondence College, South Africa. He has more over 23 years of experience within the Atlas Copco Group. Most recently, he has led the Southern Africa Holding as Vice President. Prior to that, he has held a variety of Business Control functions for the Mining and Rock Excavation Technique business area in South Africa, as well as in Southeast Asia, Chile and Sweden.

THE FUTURE IS ELECTRIC!

Epiroc is building an energy efficiency culture resulting in lower CO_2 emissions and more efficient use of resources.

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Innovation is also one of the core values of Epiroc and we always believe that to be in the business, we need to be the pioneer in innovation. The world is changing, and we are on a mission to be at the forefront of exciting innovations in the mining industry. We adapt to the times, giving our customers what they need to get the job done safely and efficiently. This means thinking ahead and offering solutions that reduce operating costs and improve health and safety. All while helping the environment where we work and live!

Epiroc also works in accordance with the Paris agreement for climate change and our 2030 sustainability goals for people and the planet are set keeping in mind our commitment to this agreement. We have an ambitious goal that by 2030 we will halve our CO_2 emissions in our activities related to operations, transport, products, and our suppliers. We are building an energy efficiency culture resulting in lower CO_2 emissions and more efficient use of resources.

One of the ways we can provide sustainable solutions to our customers is the electrification of mining equipment, in particular, underground mining equipment. Epiroc has put in a lot of resources in developing technologies that help us design and produce such equipment.

Epiroc's battery electric vehicles (BEVs) are designed to offer the highest safety and productivity with a limited amount of maintenance. The high energy density batteries are certified to international standards and offer several charging options and are easily swappable for continuous loader and truck operations. This allows machines to operate uninterrupted and a simple battery swap can boost output, right when you need it!

The best part is, these battery-powered equipment are no less than conventional equipment and deliver the same or even enhanced performance. In fact, we get additional advantages in terms of the cost of ventilation as the equipment does not emit any smoke in operation, we provide hassle-free battery changeover that is magically so quick that you literally don't feel any hurdle in operations. The information management system of battery-powered equipment is informative and easy to understand and suggests your required actions from time to time.

The operators and crew working

underground can see the benefits of a healthier underground working environment first-hand. The customers see a huge benefit in terms of service needs for battery-powered equipment.

So, it is not only the new equipment that comes with battery power we also support battery conversions for older equipment that is running with our customers and these conversions are a major cornerstone in their journey towards electric underground mines. Conversions are cost-efficient and utilise the full potential of the low total cost of ownership (TCO).

We offer short turnaround time in parallel with high performance. The conversion is included in a midlife rebuild, returning your equipment to maximum productivity and operating efficiency – including the addition of thousands of new hours with low emissions.

We also provide BAAS (battery as a service) as an option to our customers and in this case, customers need not worry about the life of the batteries and change interval. We work with customer teams to define a plan to meet the battery requirement. With BAAS, we eliminate the risk of owning batteries and provide all the benefits of electrical power. We take full responsibility for keeping the battery serviced and running to optimal capacity from certification to maintenance and technology upgrades. A true trouble-free model of operations – just subscribe to the services and get peace of mind. With batteries as a service, the function and reliability are always guaranteed, and our customer can focus their energy on what matters - increased productivity!

These machines with their innovative design features and predictable maintenance have the power to match or surpass the performance of traditional diesel equipment.

These machines with their innovative design features and predictable maintenance have the power to match or surpass the performance of traditional diesel equipment. They use 70 per cent less energy and produce 70 per cent less heat than a diesel engine-powered machine with lower ventilation costs, increased productivity, and greater overall operator satisfaction.

This is a power change that changes everything and that's why we say – the future is electric!

ABOUT THE AUTHOR:
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BENEFITS OF AI IN CONSTRUCTION

AI is being used to track the real-time interactions of workers, machinery, and objects on the site and alert supervisors of potential safety issues, construction errors, and productivity issues.

AI in construction has the potential to help players realise value throughout project lifecylces, including: Design, bidding, and financing; procurement and construction; operations and asset management; and, business model transformation. AI in construction helps the industry as a whole overcome some of our toughest challenges, including safety concerns, labour shortages, and cost and schedule overruns.

As market barriers to entry steadily lower, and advancements in AI, machine learning (ML), and analytics accelerate, you can expect AI (and allocation of resources funnelled towards AI) to play a more significant role in construction in the coming years.

What are AI and ML in construction?

AI is an aggregative term for describing when a machine mimics human cognitive functions, like problem-solving, pattern recognition, and learning. Machine learning is a subset of AI. Machine learning is a field of artificial intelligence that uses statistical techniques to give computer systems the ability to "learn" from data, without being explicitly programmed. A machine becomes better at understanding and providing insights as it is exposed to more data.

As applied in construction, the 'questions' and algorithms get significantly more complex. For instance, a machine learning program may track and evaluate progress in a grading plan to identify schedule risks early. The algorithms might 'ask questions' about cut and fill volume measurements, machine uptime and downtime, weather patterns, previous projects, or any number of inputs to

generate a risk score and determine if notifications need to be made.

The potential applications of machine learning and AI in construction are vast. Requests for information, open issues, and change orders are standard in the industry. Machine learning is like a smart assistant that can scrutinise this mountain of data. It then alerts project managers about the critical things that need their attention. Several applications already use AI in this way. Its benefits range from mundane filtering of spam emails to advanced safety monitoring.

10 examples of AI in construction

1 **Prevent cost overruns:** Most mega projects go over budget despite employing the best project teams. Artificial Neural Networks are used on projects to predict cost overruns based on factors such as project size, contract type and the competence level of project managers. Historical data such as planned start and end dates are used by predictive models to envision realistic timelines for future projects. AI helps staff remotely access real-life training material which helps them enhance their skills and knowledge quickly. This reduces the time taken to on-board new resources onto projects. As a result, project delivery is expedited.

2 **AI for better design of buildings through generative design:** Building Information Modelling is a 3D model-based process that gives architecture, engineering and construction professionals insights to efficiently plan, design, construct and manage buildings and infrastructure. In order to plan and design the construction of a project, the 3D models need to take into consideration the architecture, engineering, mechanical, electrical, and plumbing (MEP) plans and the sequence of activities of the respective teams. The challenge is to ensure that the different models from the sub-teams do not clash with each other.

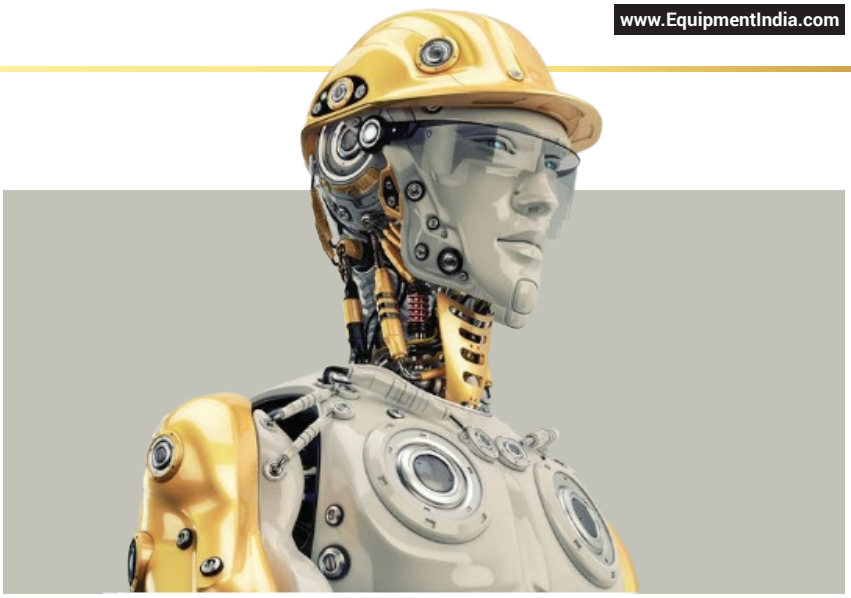
The industry uses machine learning in the form of AI-powered generative design to identify and mitigate clashes between the different models generated by the different teams to prevent rework. There is software that uses machine learning algorithms to explore all the variations of a solution and generates design alternatives. Once a user sets up requirements in the model, the generative design software creates 3D models optimised for the constraints, learning from each iteration until it comes up with the ideal model.

3 **Risk mitigation:** Every construction project has some risk that comes in many forms such as quality, safety, time, and cost risk. The larger the project, the more risk, as there are multiple sub-contractors working on different trades in parallel on job sites. There are AI and machine learning solutions today that general contractors use to monitor and prioritise risk on the job site, so the project team can focus their limited time and resources on the biggest risk factors. AI is used to automatically assign priority to issues. Subcontractors are rated based on a risk score so construction managers can work closely with high-risk teams to mitigate risk.

4 **Project planning:** One construction intelligence company launched in 2017 with the promise that its robots and artificial intelligence hold the key to solving late and over budget construction projects. The company uses robots to autonomously capture 3D scans of construction sites and then feeds that data into a deep neural network that classifies how far along different sub-projects are. If things seem off track, the management team can step in to deal with small problems before they become major issues. Algorithms of the future will use an AI technique known as "reinforcement learning." This technique allows algorithms to learn based on trial and error. It can assess endless combinations and alternatives based on similar projects. It aids in project planning since it optimises the best path and corrects itself over time.

5 **AI makes jobsites more productive:** There are companies that are starting to offer self-driving construction machinery to perform repetitive tasks more efficiently than their human counterparts, such as pouring concrete, bricklaying, welding, and demolition. Excavation and prep work is being performed by autonomous or semi-autonomous bulldozers, which can prepare a job site with the help of a human programmer to exact specifications. This frees up human workers for the construction work itself and reduces the overall time required to complete the project. Project managers can also track job site work in real time. They use facial recognition, onsite cameras, and similar technologies to assess worker productivity and conformance to procedures.

6 **AI for construction safety:** Construction workers are killed on the job five times more often than other labourers. According to OSHA, the leading causes of private sector deaths (excluding highway collisions) in the construction industry were falls, followed by struck by an object, electrocution, and caught-in/between. A Boston-based construction technology company create an algorithm that analyses photos from its job sites, scans them for safety hazards such as workers not wearing protective equipment and correlates the images with its accident records. The company says it can potentially compute risk ratings for projects so safety briefings can be held when an elevated threat is



detected. It even began ranking and releasing safety scores for each U.S. state based on COVID-19 compliance in 2020.

7 AI will address labour shortage: Labour shortages and a desire to boost the industry's low productivity are compelling construction firms to invest in AI and data science. A 2017 McKinsey report says that construction firms could boost productivity by as much as 50 per cent through real-time analysis of data. Construction companies are starting to use AI and machine learning to better plan for distribution of labour and machinery across jobs.

A robot constantly evaluating job progress and the location of workers and equipment enables project managers to tell instantly which job sites have enough workers and equipment to complete the project on schedule, and which might be falling behind where additional labour could be deployed.

An AI-powered robot such as Spot the Dog can autonomously scan a jobsite every night to monitor progress - making it possible for a large contractor like Mortenson to get more work done in remote areas where skilled labour is in short supply.

8 Off-site construction: Construction companies are increasingly relying on off-site factories staffed by autonomous robots that piece together components of a building, which are then pieced together by human workers on-site. Structures like walls can be completed assembly-line style by autonomous machinery more efficiently than their human counterparts, leaving human workers to finish the detail work like plumbing, HVAC and electrical systems when the structure is fitted together.

9 AI and big data in construction: At a time when a massive amount of data is being created every day, AI systems are exposed to an endless amount of data to learn from and improve every day. Every job site becomes a potential data source for AI. Data generated from images captured from mobile devices, drone videos, security sensors, building information modelling (BIM), and others have become a pool of information. This presents an opportunity for construction industry professionals and customers to analyse and benefit from the insights generated from the data with the help of AI and machine learning systems.

10 AI for post-construction: Building managers can use AI long after construction is complete. By collecting information about a structure through sensors, drones, and other wireless technologies, advanced analytics and AI-powered algorithms gain valuable insights about the operation and performance of a building, bridge, roads, and almost anything in the built environment. This means AI can be used to monitor developing problems, determine when preventative maintenance needs to be made, or even direct human behaviour for optimal security and safety.

The future of AI in construction

Robotics, AI, and the Internet of Things can reduce building costs by up to 20 per cent. Engineers can don virtual reality goggles and send mini-robots into buildings under construction. These robots use cameras to track the work as it progresses. AI is being used to plan the routing of electrical and plumbing systems in modern buildings. Companies are using AI to develop safety systems for worksites. AI is being used to track the real-time interactions of workers, machinery, and objects on the site and alert supervisors of potential safety issues, construction errors, and productivity issues.

Despite the predictions of massive job losses, AI is unlikely to replace the human workforce. Instead, it will alter business models in the construction industry, reduce expensive errors, reduce worksite injuries, and make building operations more efficient.

Leaders at construction companies should prioritise investment based on areas where AI can have the most impact on their company's unique needs. Early movers will set the direction of the industry and benefit in the short and long term.

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SCHWING STETTER'S BOOM PUMP: **REVOLUTIONISING THE CONSTRUCTION INDUSTRY**

The unique and compact boom pump is designed to optimise job site mobility and efficiency.

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The construction industry has seen a significant transformation over the years. With technological advancements and the introduction of innovative equipment, construction projects have become faster, safer, and more efficient. One such innovative solution that has revolutionised the industry is Schwing Stetter India's boom pump.

Concrete pumping is a crucial aspect of any construction project. It is a challenging task that requires precision and expertise. Schwing Stetter India's boom pump offers a reliable and efficient solution to this challenge. With powerful pumping units, our pumps provide dynamic load distribution, smooth jerk-less and vibration-free pumping, minimal boom bounce and reach, and minimum unfolding height.

One of the most significant advantages of Schwing's boom pump is its flexibility. Our distributor booms consist of several efficient applications

One of the most significant advantages of Schwing's boom pump is its flexibility.

with a versatile reach that are hinged together to ensure high anoeuvrability and good approachability to the concrete placing spots. This makes our pumps ideal for tight spaces on construction sites.

The twin-walled pipes of our pumps ensure long service life, and the valve is guaranteed with a longer service life, while the outriggers are highly space-saving. Furthermore, our pumps are mountable on all three-axle chassis of all leading truck manufacturers, with the prime mover being the truck's engine itself. This reduces the weight of the pump and helps save fuel. Our PTO system with a working speed of 2,100 rpm also reduces operating costs and enables easy maintenance.

The productivity and efficiency of Schwing Stetter India's boom pump are unbeatable. With our pumps, construction projects can be completed faster, with less manpower and equipment, and with reduced risk of accidents. This, in turn, translates into cost savings for the project owner.

The construction industry is always looking for ways to improve the safety of its workers. Schwing Stetter India's boom pump offers a safe and reliable solution to concrete pumping. With the minimal boom bounce and reach of our pumps, the risk of accidents is significantly reduced. The smooth jerk-less and vibration-free pumping ensures that the concrete is placed precisely where it is needed, without any spills or wastage.

One of the most significant advantages of our boom pump is its small footprint. Our pumps occupy 20 per cent lesser working area and provide the lowest working width, making them ideal for projects with limited space. Additionally, the hydraulic operations of our boom pump provide exceptional job site mobility, allowing operators to manoeuvre and position the pump quickly and easily.

The rear H-Outriggers of our boom pump offer several advantages over the more common swing-out outriggers. They offer storage space on both sides for accessories and hoses, and the easy outrigger pump can be safely supported on one side. This design feature allows for easier access to the pump and faster setup and dismantling times. Furthermore, the working range of our boom pump covers 138 degrees, enabling operators to reach even the most challenging and hard-to-reach areas.

Our boom pump also features a standard sideboard that can be hinged and features integrated hose/pipe mounts. Additionally, an extended length of the sideboard is available as an option, providing even more flexibility for operators. The piston rods and internally laid hydraulic lines of our boom pump ensure optimal durability and resistance to wear and tear, enabling support legs to withstand the rigors of all job sites.

Schwing Stetter India's unique and compact boom pump is designed to optimise job site mobility and efficiency. Our pumps are ideal for small and complex job sites, allowing operators to work efficiently and effectively without compromising on productivity. The rear H-Outriggers, easy outrigger pump, and standard sideboard make our boom pump one of the most user-friendly and convenient pumps on the market.

In conclusion, Schwing Stetter India's boom pump is a game-changer in the construction industry. With its unbeatable productivity, flexibility, safety features, and easy outriggers make it easy and convenient for operators to work efficiently and effectively.

"R&D SERVES AS THE CORNERSTONE OF NETRADYNE'S STRATEGIC APPROACH."

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Amit Kumar, Sr Director – Marketing, Netradyne Technology, speaks on the company's flagship product – Driver•i – and how it contributes to enhancing fleet and driver safety.

Q Tell us more about Netradyne and its solutions.

Netradyne is an eight-year-old company that has rapidly evolved into a prominent player in the road safety and driver monitoring sphere. Founded by ex-Qualcomm executives, our revenue has seen a significant uptick, signalling a transition from startup to a growth-stage entity. Operating across seven countries, including India and the US, we're positioned as a front-runner in leveraging technology to mitigate road accidents. With a strong emphasis on innovation and R&D, our solutions are tailored to address the pressing challenges faced by the transportation sector.

Recent road accident report for 2022 MoRTH has shed light on some surprising yet critical insights into road accidents in India. Contrary to popular belief, straight roads, not winding ones, account for a staggering 67 per cent of accidents. Moreover, favourable weather conditions, such as sunny and clear skies, contribute to approximately 74 per cent of road accidents. Despite only comprising 2 per cent of the total road network, national highways are disproportionately associated with 33 per cent of accidents. These statistics underscore the pivotal role of human error in driving accidents, emphasising the urgent need for intervention and innovative solutions to enhance road safety.

Q How does Netradyne's flagship product—Driver•i—contribute to enhancing fleet and driver safety?

At Netradyne, our cutting-edge technology is designed to monitor and analyse driver behaviour in real-time, thereby significantly reducing the risk of accidents. By leveraging advanced algorithms and sensors, our systems can detect various risky behaviours, including speeding, distraction, and fatigue. Through timely alerts, personalised coaching, and actionable insights, we empower both drivers and fleet managers to make informed decisions, ultimately fostering a safer driving environment.

Q Can you provide a brief overview of Netradyne's collaboration with GreenLine Mobility Solutions and the key objectives behind this partnership?

Our collaboration with GreenLine Mobility represents a significant milestone in our journey towards enhancing road safety. GreenLine, renowned for its commitment to sustainability and innovation, shares our vision of prioritising driver safety in the transportation sector. Through this partnership, we aim to integrate our cutting-edge technologies into GreenLine's operations, thereby optimising safety protocols, reducing accidents, and setting new driver safety benchmarks for the industry.

Q What role does research and development play in Netradyne's strategy?

R&D serve as the cornerstone of Netradyne's strategic approach. Led by visionary founders with a profound background in technology, we are relentless in our pursuit of innovation

> "As an IoT platform and based on advanced sensors, it seamlessly integrates with various vehicle models. However, the key lies in educating stakeholders and raising awareness about the transformative potential of such solutions."

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and excellence. By staying ahead of the curve and continuously refining our solutions, we ensure that our technology remains at the forefront of the industry, delivering unparalleled value to our customers.

Q Are there any challenges in integrating this technology into existing systems, and how does Netradyne plan to address them?

Integrating our technology into existing systems as an aftermarket solution is not complex. As an IoT platform and based on advanced sensors, it seamlessly integrates with various vehicle models. However, the key lies in educating stakeholders and raising awareness about the transformative potential of such solutions. Once the benefits are clearly understood, the integration process becomes smoother, paving the way for widespread adoption.

Technology can seamlessly integrate as an intrinsic solution within new vehicles also by OEMs, necessitating integration with other systems provided by the OEM in the vehicle.

FORM IV (RULES)
STATEMENT BY THE PUBLISHER

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Signature of the Publisher
Tarun Pal

Q What is the price disparity and acceptability of these solutions?

Pricing and flexibility are crucial considerations in the adoption of any technology, particularly in a cost-sensitive market like India. While safety measures are often viewed as an additional cost, forward-thinking companies recognise them as invaluable investments. Our solutions offer a compelling value proposition, with costs quickly offset by the tangible benefits of accident prevention and operational efficiency.

Q How does Netradyne support customers with after-sales service?

Customer support and after-sales service are integral components of our commitment to excellence. As part of our solution package, we offer comprehensive after-sales support, encompassing on-site assistance, maintenance, and troubleshooting. By ensuring seamless operation and swift resolution of any issues, we strive to deliver an exceptional customer experience.

Q What are your plans for the future?

Looking ahead, Netradyne is firmly focused on introducing new features regularly and staying ahead in delivering best in class accuracy and precision of our AI solution. With an unwavering commitment to innovation and customer satisfaction, we aim to solidify our position as a leader in road safety and driver monitoring solutions.

Q Anything else you'd like to share?

I'd like to highlight our dedication to innovation and our commitment to the "Make in India, Make for World" initiative. With R&D and design conducted domestically, we take pride in our contribution to the nation's technological landscape. Additionally, our high accuracy levels and customer confidence underscore our relentless pursuit of excellence, as we continue to push boundaries and make roads safer for all.

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- Global Industry Trends

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"THE END GOAL IS TO HAVE A FULLY AUTONOMOUS GRADER."

Amarnath Ramachandran, Managing Director, Arx Mining and Construction Equipment

Q Could you discuss the significance of 'Made in India' in Arx's portfolio, and how does the company ensure that these products meet international standards?

What is the real connotation of 'Made in India'? What is really made in India? Is it a globally competitive product or is it an old watered-down product from the archives of an MNC to cater to a price sensitive market? Or a product brought in kit-form into India to work around new import restrictions in India as certain bordering nations? As for as Arx is concerned, we are 'Designing in India'. We make machines in India for the world.

The shapes and styling are designed jointly with an Italian partner who can produce quality goods at an economical price for lower volumes. The drivelines are state-of-the-art. The mechatronics is latest generation and no different from what you experienced in the latest cars. Air suspension seats, colour displays integral with the steering column, latest proportional valves, pumps with electronic controllers, health monitoring software, autonomous emergency braking system (AEBS). All this and more.

However, the real proof of the pudding is in the eating. So, in 2025, when Arx commences exports, one will see these machines move into many other regions with our established and skilled dealer network and our hardworking and dedicated operators and technicians. The best is yet to come!

Q How does ARX mining differentiate itself from competitors in terms of product quality, customer service, and overall value proposition?

'Value that works' is the philosophy that drives our product and service offerings. From aesthetics, ergonomics, latest driveline technology, top of the line torque absorption, fuel efficiency and safety. All of these at very reasonable prices. Arx also offers a comprehensive solution for service and spares. A strong dealer network, placing dedicated teams at customer sites, training the customer operators and service technicians, offering optimally priced spares. All these are geared at maximising uptime and reducing the total cost of ownership for our customers.

Q How does the company integrate internet of things (IOT) and automation into its product offerings?

All engines on Arx machines are CAN controlled (with an ECU), except the low weight forklifts (10 t and 12 t). All transmissions are from ZF, again with electronic control and a CAN enabled TCU. The pumps are from Casappa with a pump controller and the vehicle controllers are from 3b6 Italy (now part of Cobo). We have a Telematics controller from Traxroot. The 3D grader laser controllers are from Trimble. Also, automated drilling solutions for our mining drill. We have radar, LIDAR solutions integrated with a brake-by-wire system from Safim.

The end goal is to have a fully autonomous grader. This will be done on the larger mining graders initially, as the mining areas are more secured as opposed to highway sites.

Q Could you elaborate on ARX's approach to sustainability and environmental responsibility?

Arx has a holistic approach to sustainability. We plan to move step by step on the environmental front. We start with clean diesel technology. We already have engines in our cargo handling equipment which are bio-fuel ready (HVO 100). We are working with engine partners to move to either hybrid or hydrogen solutions for the motor grader.

Q Can you share some insights into ARX's expansion strategy? What are the key markets the company is targeting for growth?

Arx is an engineering company. We are very young as we have been in operations only for 3.5 years. We have a cargo handling portfolio for which we have just rolled out our 100th machine. This year, we look to stabilise the grader production. We will be working on enhancing our mining portfolio. We plan to commence exports in 2025.

"RECENT PAST SEES SIGNIFICANT IOT DEVELOPMENT FOR REMOTE & EQUIPMENT MONITORING."

BKR Prasad, General Manager – Marketing, Tata Hitachi Construction Machinery

Q Can you describe any special features or technologies that differentiate your mining equipment from that of your competitors?

From a technology point of view, the recent past has witnessed a lot of development, especially in IoT, which is working towards remote monitoring, health monitoring of equipment.

Tata Hitachi uses Consite in the GI series of excavators to capture and send data on performance parameters like idle hours, operating hours, engine run hours, etc. It also sends alerts on any abnormal behavior in the equipment health like hydraulic oil temp going up, engine oil temp going up, etc., which help the customers, avoid failures on the engine/hydraulics.

Consite generates a monthly report and sends updates to customers. The analytics of the captured data help to improve the operational efficiency of the machines. Consite can be accessed through the website or an app.

Q What is your company's vision for the future of the mining industry in India, and how do you plan to contribute to its growth and development?

Tata Hitachi's vision statement states the organisation's focus is on mining in India. We have been working very closely with mining companies, mine operators, etc., which has become our listening and learning tools for our future development. Also, by being a part of Hitachi Construction Machinery, Japan, we get regular input on developments happening globally in the mining equipment industry. These updates help us make ourselves future-ready.

Q What types of mining equipment do you manufacture, and what is the range of products you offer?

Tata Hitachi is a joint venture and a subsidiary of Tata Motors, India, and Hitachi Construction Machinery, Japan. From a mining equipment point of view, the organisation produces excavators, dumpers, wheel loaders, and other attachments.

Tata Hitachi has manufacturing facilities in Kharagpur and Dharwad. Both plants have the latest technology in CNC machining centres, robotic centres, and a wide range of fixtures and manipulators for manufacturing world-class products. Tata Hitachi also has access to the product range of our parent company, Hitachi Construction Machinery, Japan.

Tata Hitachi offers excavators from 0.02 cu m bucket capacity to 6.5 cu m bucket capacity in India, of which excavators from 3.0 cu m to 6.5 cu m, bucket capacity are used in open-cast mines and are manufactured in India. Beyond 10 cu m and up to 45 cu m, Tata Hitachi offers excavators from Hitachi Construction Machinery, Japan. These excavators have the option of being diesel or electric-driven, depending on the requirements of customers.

In-case of wheel loaders up to 5 t payload are being manufactured in India, and those beyond 5T, which are 7 t, 9-10 t, and 11-12 t, are imported from Hitachi Construction Machinery, Japan. Hitachi also manufactures AC drive dumpers of 190 t, 240 t and 290 t classes, which are sold and serviced in

India by Tata Hitachi.

Q How do you ensure that your equipment meets the safety standards set by the Indian government and international organisations?

Tata Hitachi has a dedicated research and development department that is primarily engaged with various government statutory bodies like the DGMS (Directorate General of Mines Safety) and others that frequently interact with changes in safety standards and regulations. So that these regulations can be developed and incorporated into the equipment manufactured in India.

The Tata Hitachi team also constantly interacts with Hitachi Construction Machinery, Japan, and communicates about the latest developments and government updates so that the same can be incorporated in the machines that are offered to Indian customers.

Q How do you ensure that your products are environmentally sustainable and comply with environmental regulations?

Tata Hitachi has been developing products/features that can reduce the impact on the environment like controlling the wastage of hydraulic oil/exhaust gases from engines.

The engines fitted on mining equipment are compliant with EPA tier I/II BS norms, etc. As these machines use hydraulic oils for operation, Tata Hitachi is currently using special hydraulic oils that come with extended changing intervals, resulting in reduction in wastage during the life of the equipment.

Q What challenges do you anticipate facing in the mining equipment market in India over the next few years, and how do you plan to address them?

Mining is a tough job, and the mine operators work under tremendous cost pressure.

Plus the mining project duration varies from three to five years (operating period). The volatility of the economy, whether in manpower cost or fuel cost going up drastically, also affects the mining operations. If these cost increases are not factored in at the time of taking the contracts, the operating project cost may become unviable.

Q How do you stay informed about changes in regulations and policies that may impact the mining equipment industry in India?

Tata Hitachi is part of various forums and industry associations where discussion on such changes in regulations and policies are held. There have been initiatives by the policy makers to involve the mining equipment manufacturers, which has also helped the organisation to be ready for the Indian market.

Q How does your company work with mining companies to ensure that your equipment is integrated effectively into their operations?

Tata Hitachi offers solutions like full maintenance contracts/annual maintenance contracts. A competent crew is deployed at site for a defined period, which has the responsibility of ensuring the availability of working equipment. The team helps build competency at customer site by way of handholding/training the operators and informing them about maintenance of the equipment. These activities start once the equipment reaches at the site, which helps in effective operations at customer end.

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NAVIGATING THE FUTURE

Ongoing advancements in technology, including the integration of IoT, AI, and automation, are revolutionising the construction and mining equipment market.

The global construction and mining equipment market is projected to exhibit a compound annual growth rate (CAGR) of 3.8 per cent, surging from a value of $173.4 billion in 2023 to $225.1 billion by 2030, according to Persistence Market Research. Construction and mining equipment encompass a diverse array of specialised machinery tailored for heavy-duty tasks in construction and mining operations, such as excavators, bulldozers, loaders, crushers, and drilling equipment. These machines play a pivotal role in bolstering efficiency, productivity, and safety in demanding work environments, facilitating excavation, transportation, and material processing essential for construction projects and mining activities on a global scale.

The expansion of the construction and mining equipment market is underpinned by various factors, including robust infrastructure development, escalating demand for minerals, and advancements in technology. Infrastructure initiatives, particularly in emerging economies, are driving the demand for construction equipment, a trend anticipated to persist. Furthermore, the mining sector's pursuit of operational efficiency and automation is driving the uptake of sophisticated mining equipment. Promising avenues for growth are evident in the development of environmentally sustainable machinery and the incorporation of cutting-edge technologies such as Internet of Things (IoT) and Artificial Intelligence (AI) to augment equipment performance and safety standards. With a concerted focus on innovation and addressing sustainability imperatives, the construction and mining equipment market is poised for significant expansion and transformation in the foreseeable future.

Key market growth factors

Infrastructure development: Robust investment in infrastructure projects, particularly in emerging economies, is a primary driver of demand for construction equipment. Government initiatives aimed at improving transportation networks, building residential and commercial complexes, and enhancing public utilities spur the need for heavy-duty machinery.

Rising demand for minerals: The increasing demand for minerals, driven by industrialisation, urbanisation, and infrastructure development, fuels growth in the mining sector. This demand necessitates the adoption of advanced mining equipment to extract, process, and transport minerals efficiently.

Technological advancements: Ongoing advancements in technology, including the integration of IoT, AI, and automation, are revolutionising the construction and mining equipment market. Innovations such as telematics, predictive maintenance, and autonomous vehicles improve equipment efficiency, productivity, and safety, driving market growth.

Operational efficiency: In the mining sector, there is a growing emphasis on improving operational efficiency and reducing costs. This leads to the adoption of advanced equipment and technologies that optimise processes, enhance productivity, and minimise downtime.

Market restraints and challenges

Economic uncertainty: Fluctuations in global economic conditions, such as recessions, currency devaluations, and

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KEY SESSIONS

Inaugural Session	Session 1	Session 2	Session 3
	Building India as a Global Manufacturing Hub for Construction Equipment - Challenges & Opportunities	Robust and Resilient Supply Chain Ecosystem: Driving Indigenization & Global Competitiveness	Technological Advancement; Automation; Digitization; Zero Emissions in Construction Equipment Industry– Disruption & Way Forward

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trade disputes, can impact investment decisions and project financing. Economic uncertainty may lead to delays or cancellations of infrastructure projects, affecting equipment demand.

Regulatory compliance: Stringent regulatory requirements related to safety, emissions, and environmental protection pose challenges for equipment manufacturers. Compliance with diverse regulations across different regions adds complexity and costs to product development and operations.

High initial investment: The capital-intensive nature of construction and mining equipment poses a barrier to entry for new market players and may deter smaller companies from investing in advanced machinery. High upfront costs for purchasing and maintaining equipment can strain budgets, particularly for small and medium-sized enterprises (SMEs).

Technological obsolescence: Rapid technological advancements and innovation cycles in equipment design and functionality can render existing machinery obsolete more quickly. Equipment manufacturers face pressure to continuously upgrade their products to remain competitive, leading to shorter product lifecycles and potential challenges in managing inventory and aftermarket support.

The industry is undergoing a digital transformation, driven by advancements in technologies such as IoT, AI, Big Data analytics, and automation.

Skills shortage: The industry is experiencing a shortage of skilled labour, particularly operators and technicians proficient in operating and maintaining complex equipment. This shortage can impact productivity, increase training costs, and affect equipment uptime and performance.

Top trends

Digital transformation: The industry is undergoing a digital transformation, driven by advancements in technologies such as IoT, AI, Big Data analytics, and automation. Equipment manufacturers are integrating digital solutions into their products to improve efficiency, productivity, and safety. Telematics and remote monitoring enable real-time equipment tracking, predictive maintenance, and performance optimisation.

Equipment manufacturers are integrating digital solutions into their products to improve efficiency, productivity, and safety.

Sustainability initiatives: There is a growing focus on sustainability and environmental stewardship within the construction and mining sectors. Equipment manufacturers are developing eco-friendly solutions with reduced emissions, improved fuel efficiency, and recyclable materials. Sustainable practices, such as energy-efficient equipment design and waste reduction, are gaining traction to minimise the industry's environmental footprint.

Electrification and alternative fuels: Electrification is emerging as a key trend in construction and mining equipment, driven by the need to reduce emissions and operating costs. Manufacturers are developing electric and hybrid vehicles for various applications, including excavators, loaders, and haul trucks. Additionally, there is a growing interest in alternative fuels such as hydrogen and biofuels to power heavy machinery.

The $5 Trillion Formula

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The path to achieving a $5 trillion economy in India involves inclusive growth, digital economy promotion, fintech advancement, technology-enabled development, energy transition, climate action, and a cycle of investment and growth. In the 18th Infrastructure Today Annual issue experts outlined strategies in four key verticals:

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- **Investment**
- **Innovation**
- **Inclusion**

This Annual issue is an invaluable resource for policymakers, industry professionals, and stakeholders, providing comprehensive insights into these pillars of development and their role in shaping the Indian economy.

Also, read articles written by experts like:

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- **Santhosh Kumar**, Vice Chairman, ANAROCK Group
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ITALIAN CE MARKET SEES SLIGHT DIP IN 2023

Road machines market remains stable, earth moving machines decline.

In the twelve months of 2023, 24,704 construction equipment have been placed on the Italian market, with a 5 per cent decrease compared to 2022. More specifically, 23,779 earth moving machines (-5 per cent) and 925 road machines (+2 per cent) were sold in 2023.

These figures have been released by Unacea, the Italian construction equipment association, based on sales data of manufacturers and importers. Comparing the fourth quarter of 2023 to the same period of 2022, the market sees a 7 per cent decline; the earthmoving machinery segment turns negative (-8 per cent), while road construction machines show an 18 per cent growth.

"The Italian market of construction equipment experiences a slight contraction in 2023 – said Michele Vitulano, president of Unacea. However, sales seem to have stabilised at very high levels, which we believe can be maintained in the coming quarters of 2024."

Italian Market (Jan - Dec 2023)

	Jan-Dec 2022	Jan-Dec 2023	
Dozers	47	72	53%
Crawler Excavators	4977	4531	-9%
Wheeled Excavators	389	389	-1%
Wheel Loaders	1896	1664	-12%
AWS Backhoe Loaders	110	96	13%
Rigid backhoe Loaders	124	89	-28%
Mini Excavators	14863	13806	-7%
Skid Steer Loaders	1291	1431	11%
Track Loaders	1343	1615	20%
Articulated Dumpers	81	89	10%
Total Earthmoving Machines	**25,121**	**27,779**	**-5%**
Rollers	528	609	15%
Cold Planers	109	100	-8%
Finishers	274	216	-21%
Total Road Machines	**911**	**925**	**2%**
Total Construction Equipment	**26,032**	**24,704**	**-5%**

Positive the results of foreign trade, as indicated by the latest Unacea-Cer foreign trade report. Exports between January and October 2023 surpassed Euro 2.8 billion, recording a +13 per cent compared to the same period in 2022. Imports also showed a positive trend, increasing by 13 per cent up to Euro 1.9 billion, in line with the surpassed performance observed in the Italian market. Trade balance remains in surplus by nearly Euro 965 million, reflecting a 14 per cent growth compared to the previous year.

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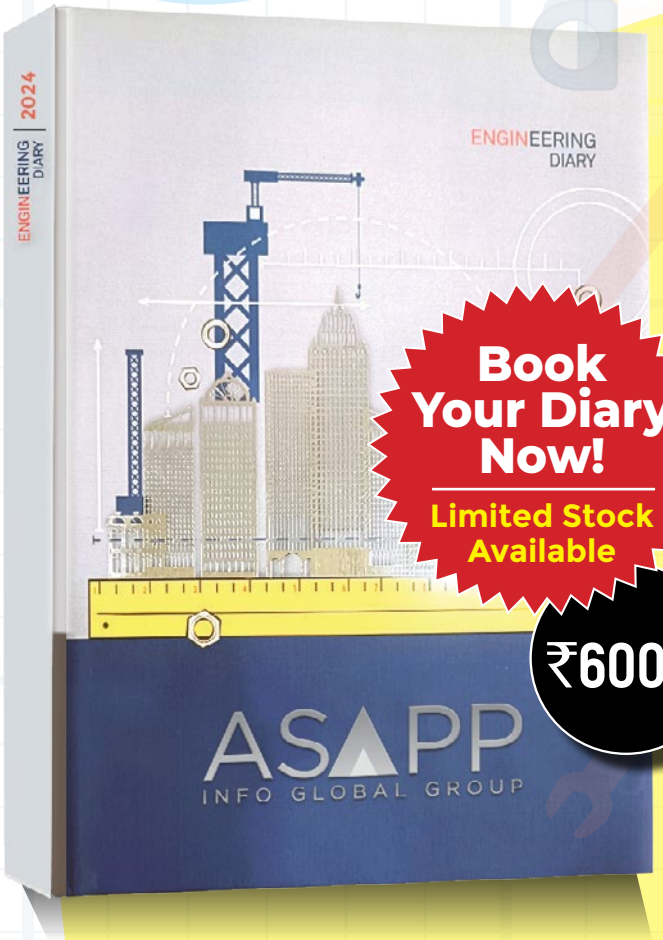

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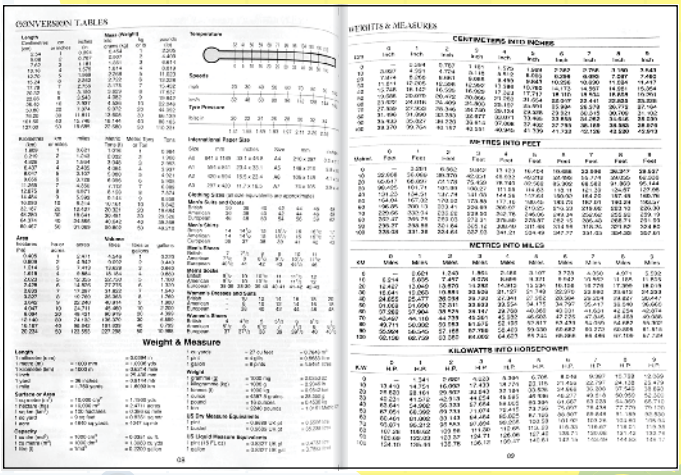

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Navigating the Automation Wave

The panel discussion explores insights from industry experts on the challenges and strategic imperatives driving the adoption of automation in diverse sectors.

As industries evolve amidst technological advancements and changing market dynamics, the imperative to enhance productivity and efficiency has never been more pressing. A recent panel discussion, during FM Logistic's inauguration of the state-of-the-art warehouse in Bhiwandi, Mumbai, delved into the challenges and opportunities surrounding automation in the context of Indian businesses, shedding light on the diverse perspectives shaping this transformative journey.

FM Logistic India, one of the leading French contract logistics providers, inaugurated its 3rd state-of-the-art multi-client facility (MCF) in India's largest logistics hub of Bhiwandi on Thursday in the presence of its customers and partners. This new facility reinforces its commitment to delivering world-class sustainable omni-channel solutions to customers in various industries.

Gautam Dembla, Chairman, FM Logistic India, emphasised the heightened expectations for prompt product delivery driven by the country's economic growth and infrastructure investments. Demla, who was also the moderator, said, "Customers now anticipate service levels akin to e-commerce platforms, presenting a challenge for businesses to meet these demands efficiently. Government initiatives facilitating value-added services like co-packing have revolutionized warehouse capabilities, raising the question of how automation can optimize operations to address evolving customer needs."

Florence Petit, Country Head, Supply Chain Management, Legrand, echoed these sentiments, highlighting challenges such as high reliance on manual labor and frequent errors in tasks like unit picking. Transitioning to new facilities exacerbates these issues, impacting operational efficiency and customer satisfaction. Automation offers a solution to improve accuracy and efficiency, particularly in tasks like loading and unloading, which are prone to delays and revenue loss.

Sandeep Bansal, Chief Business Officer, Falcon Autotech, outlined four key trends influencing automation adoption: rising labour costs, increasing rents, heightened consumer expectations, and competitive pressures. Strategic adoption of automation is essential to enhance operational resilience and meet customer demands, with varying perspectives among companies based on their maturity as automation buyers.

Vinayak Bhat, General Manager, Bastian Solutions, emphasised the need for automation in FMCG operations to maintain efficiency amidst labour shortages and fluctuating consumer behaviors. He added, "Starting with smaller, manageable automation projects builds confidence and facilitates broader adoption, allowing businesses to reap long-term benefits while freeing up manpower for value-added tasks."

Balaji Reddipalli, Group Head – Supply Chain, Borosil, echoed the sentiment, emphasising the gradual embrace of automation by Indian businesses. Patience and incremental implementation is the key to successful adoption, allowing organisations to address specific pain points and add value while balancing cost considerations.

Loic Delaitre, Group Automation Director, FM Logistic, emphasised the importance of considering broader strategies and aligning automation initiatives with customer visions and long-term goals. Automation should be viewed as enhancing processes rather than replacing human effort, with a focus on solving problems and adding value to the business.

The transition towards automation in Indian businesses is driven by the need to enhance efficiency, meet evolving customer expectations, and maintain competitiveness. Starting with manageable projects and embracing incremental implementation are crucial steps towards achieving long-term operational excellence and business growth in a rapidly changing market landscape.

"WE HAVE TAILORED PRODUCTS FOR ANY PROCESS NEEDS."

Abhishek Bohra, Partner, Bohmen Industries

Q Could you provide an overview of the types of switches manufactured and supplied by Bohmen?

Bohmen is an indigenous brand of position detecting devices, commonly referred to as limit switches. Starting in 1979, we today offer a wide range of switches covering various contact combinations, types of enclosures and actuating mechanisms. We also offer custom-designed products for all process requirements.

Q What sets Bohmen apart from other manufacturers and suppliers of switches in the market?

At Bohmen, we believe in consistent efforts to design, produce and supply products, that are easy to integrate within machine design, reliable to use, economical to procure and readily available when wanted across the globe. This thought is at the core of our manufacturing philosophy and makes our brand stand out amongst our peers.

Q What are the primary industries or sectors that Bohmen serves with its products?

To put it very simply, if it's equipment for industry, you will find a need for one of our products. Core manufacturing sector with its various arms like construction, material handling,

Transportation, railways, textiles, diemoulds, metal

manufacturing, dairy and food, elevators, boilers, panels, HVACs, packing, etc. are some who use the products we make.

Q What measures does Bohmen take to stay updated with technological advancements and industry standards in switch manufacturing?

We are partnering with some of the best brands in engineering raw materials so that we can utilise their expertise in improving our products and compete on the global platform. Our ISO 9002:2015 system auditors have guided us for the past 10 years to adopt some of the best industrial practices. We interact with the best test facilitators in India, to ensure our products comply with the most widely accepted standards like the CE mark.

Q Can you share any recent innovations or developments in switch technology that Bohmen has been involved in?

We have developed and deployed a very cost effective alternative to conventional metal limit switches, which helps low cost machine manufacturers to use reliable switchgear for their machines. It caters to the small manufacturing units across India, reducing their downtimes. Economy with performance is the resultant.

Q In what ways does Bohmen contribute to sustainability and environmental responsibility in its manufacturing processes?

We make use of recycled packaging paper for our in-house storage and handling of raw materials. Our pet project is to create a reusable box for delivering our products to our customers that can be economically returned to be reused, effectively reducing the use of carton boxes. We will be introducing that very soon.

Q Looking ahead, what are the key priorities or goals for Bohmen in the next few years?

We seek to establish Bohmen as a strong brand in the manufacturing sector. Our short term goal is to become visible to all our potential customers. In the medium term, we will present global products made in India, for India and the world.

"WE PURSUE CARBON CONTROL THROUGH RIGOROUS R&D."

Harsh Vardhan Jain, Chief Executive Officer, Vinni Chemicals

Vinni Chemicals is a leader in radiator anti-freeze coolants, brake fluids and fuel additives with its extensive expertise. The company specialises in custom labelling under customer branding, pioneering in brake fluids, corrosion inhibitor, antifreeze radiator coolants, performance-enhancing fuel additives, lubricants and greases.

The company boasts an art production facility spread across 6,000 sq m in Barotiwala and over 5,000 sq m in Baddi in Himachal Pradesh under its sister concern Vingreases LLP producing

16,00,000 litres (per shift) per month for coolants. The Barotiwala, Baddi plant has additional capacity at Vingreases LLP of 28.00.000 litres (per shift) per month for lubes and 5,00,000 kg of greases (per shift) per month.

Fuel adulteration: Fuel adulteration and the use of biodiesel pose a challenge. Due to the remote nature of the use of construction and mining equipment, fuel quality is a concern. Due to lack of bio-diesel knowledge, users use it in huge quantities without realising its impact on engines or fuel injection system.

Sustainability: We pursue carbon control and sustainability through rigorous R&D efforts.


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JCB INTRODUCES TWO TANDEM-DRUM COMPACTORS

JCB has re-entered the North American paving market with two new tandem-drum compactors. Designed for ease of use, all-day productivity, low maintenance, and operator comfort, the CT160 and CT260 have been available in markets outside of North America for some time, earning nearly 25 per cent of sales in some regions. The company says the release of the new machines at Pave/X 2024," paves the way for the rollout of an extensive portfolio of compaction equipment."

The new tandem rollers will be branded once again under the Vibromax name after the German company JCB was acquired in 2005. At 3,770 to 6,041 pounds, these machines are easily trailered. The CT160 offers a choice of either a 31.5-inch or a 39.3-inch drum. The CT260 comes with a 47.2-inch drum.

JCB says work modes on the control panels are easy to understand, and switches are sized to create positive tactile feedback even with gloved hands, while anti-vibration mounts reduce fatigue by isolating the operator from the drum vibrations.

Automatic vibration control is standard, and the CT160 and CT260 feature three vibration settings:

- Vibration for both drums
- Vibration for the rear drum only
- Vibration for the front drum only

A manually adjustable offset on the front drum enables the operator to avoid damage to curbs and ironwork. The company says the rear drum is flush with the rear chassis, so operators can work close to walls or obstacles. Also, chamfered edges on the drums ensure a smooth finish, and a pressurised water spray system keeps the drums clean during operation, the company says. The drum scraper bars (two per drum) can be adjusted whether working with stone or asphalt.

Maintenance also has been simplified on the JCB machines. The central articulation joint is maintenance-free, cutting greasing time and operating costs while preventing neglect for rental customers, according to JCB.

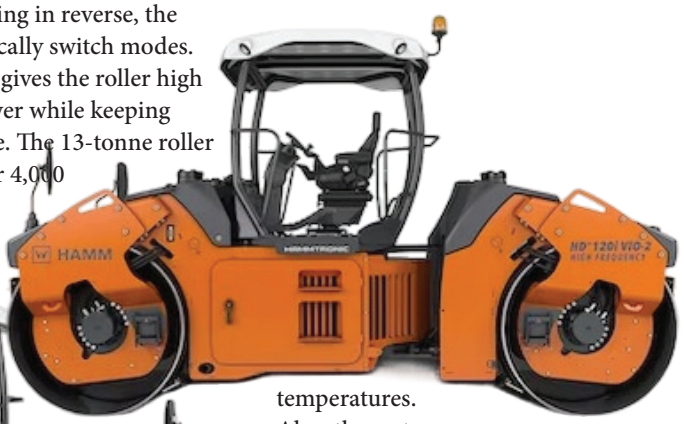
HAMM LAUNCHES TWO NEW TANDEM ASPHALT ROLLERS

Hamm has introduced two new asphalt tandem rollers that can compact with vibration or oscillation. The HD+ 120i V-VIO and the HD+ 120i VIO-2 HF are now available in the North American market. The release of the new models comes just months after new models weighing 15,433 pounds and 17,636 pounds were launched in the summer of 2023 spanning multiple weight classes.

Both new rollers run on a 154-horsepower Deutz engine and compact at widths of 78 inches. The HD+ 120i V-VIO, which weighs 28,467 pounds, features a vibrating roller drum at 3,000 vibrations per minute at the front and a VIO drum for oscillation or vibration at the rear.

The 29,966-pound HD+ 120i VIO-2 HF provides two VIO drums. The operator can control oscillation and vibration from the cab. An automatic control feature on the HD+ 120i VIO-2 HF ensures that the front drum in either travel direction is always in vibration mode, while oscillation or static compaction is used on the rear drum.

When traveling in reverse, the drums automatically switch modes. Hamm says this gives the roller high compaction power while keeping operation simple. The 13-tonne roller compacts at over 4,000 vibrations per minute.



The combination of vibration or two oscillation drums together eliminates the need for switching machines and additional crew members on a jobsite, the company says. In addition, the dual-featured compactors require fewer double passes.

Oscillation can be deployed for compaction of joints at lower temperatures. Also, the system prevents particle crushing and overcompaction while reducing noise and vibration. According to Hamm, the HD+ 120i VIO-2 HF offers nine different combinations of compaction methods.

Both rollers have spacious, clear-view cabs featuring Hamm's Easy Operating concept that combines intuitive operation with clear guidance and ergonomics. For example, the seat is permane ntly attached to the steering column including the dashboard. As a result, all the displays remain within the operator's field of vision in any sitting position. The rollers are steered by steering wheel. The multifunction armrest with joystick can be folded back.

YANMAR'S FIRST COMPACT TRACK LOADER, THE TL100VS

Yanmar announced its entrance into the compact track loader market at last year's ConExpo, and now, its first model, a TL100VS, has rolled off the production line. The company says the expansion of its compact equipment offering is the culmination of four years of research and development, the acquisition of a U.S. manufacturing facility and the addition of a CTL-focused engineering team.

"It's immensely satisfying to see these first machines roll off the line," said Matt Deloglos, vice president of commercial, Yanmar Compact Equipment North America. "Our team has worked tirelessly towards this goal for the last four years with designing, testing and manufacturing these machines as well as getting the plant and our team ready to launch these products."

Ranging from 67 to 103.5 horsepower, the full line of CTLs includes the TL65RS, TL75VS, TL80VS and TL100VS. All models are construction-grade machines and include extra durability for tough conditions, while the Tier 4 Final Yanmar diesel engines offer plenty of power, the company says. Additional features include 360-degree visibility from the standard suspended seat, a 7-inch color display, a torsion-axle suspended undercarriage, a removable roof hatch escape, LED lights, and optional SmartAssist telematics.

The vertical-lift TL100VS is equipped with a 103.5-horsepower Yanmar 4TNV94FHT diesel engine with a maximum travel speed of 8 mph. It weighs 10,555 pounds and has a rated operating capacity of 3,780 pounds.

Initially, Yanmar said production of the TL100VS was to begin in the spring of 2023, with the other three models starting production in late 2023. The remaining new models are now set for production later in 2024. The CTLs round out Yanmar's compact equipment lineup, which also includes mini excavators, compact wheel loaders, and tracked carriers.

DEVELON UNVEILS HB-SERIES BREAKERS FOR EXCAVATORS

Develon, formerly known as Doosan Infracore, has expanded its attachment offering with its HB-Series hydraulic breakers, the HB06H and HB15FH, in North America. Engineered for high performance, the new breakers have a simplified design that allows for easier maintenance and use in a variety of demolition, mining, and general construction applications, the company says.

The company says the breakers' are enhanced through an advanced heat treatment process and the use of quality materials for key components, such as the cylinder and piston.

"The HB-series breakers provide the highest possible productivity, whether the excavator operator is breaking concrete or rock," says Jacob Sherman, product and dealer marketing manager at Develon.

In operation, the energy of the piston stroke is collected by charged nitrogen gas, and the Develon breakers use an inward valve system with a simple structure and fewer internal parts. In addition, a urethane damper prevents vibrations that can damage the breaker. The front head supports the breaker and assemblies with a bushing, which absorbs the impact of the tool.

According to the company, the low-noise housing is ideal for excavators working in urban areas where noise levels must be controlled or where local regulations require damped breakers. The HB06H and HB15FH, which are backed by a one-year warranty, are compatible with the DX62R-7 and DX63-7 mini excavators, the DX140LC-7 and DX140LCR-7 crawler excavators, and the DX140W-7 wheeled excavator.

The HB06H is designed for machines with hydraulic flow of 10.5 to 18.5 gallons per minute. It weighs 750 pounds and delivers 500-900 blows per minute. The HB15FH requires 21.1 to 29.1 gallons per minute of flow. It weighs 2,129 pounds and delivers 350-700 blows per minute.

To ensure performance, the company says it is important to select the appropriate chisel (moil point, pyramidal, wedge, or blunt) based on the application.

Moil point — Demolition, hard ground, or concrete.

Pyramidal — Concrete and tough rock, asphalt, and trenching or excavation.

Wedge — Trenching, general excavation, concrete breaking.

Blunt — Block splitting, com pact abrasion, boulder, or slab breaking.

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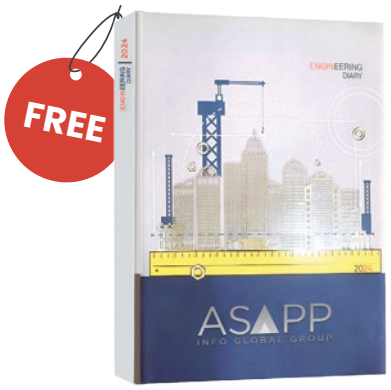

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COMPACTOR

1 | Nagar Parishad Masaurhi
Details: Tenders are invited for supply of refuse compactor bin 1,110 litre (Q3).
Submission date: March 9, 2024 | **Location:** Masaurhi, Bihar
Contact: Exeuctive Officer, Nagar Parishad Masaurhi, Bihar

2 | Nuclear Power Corporation of India
Details: Tenders are invited for supply of mobile storage compactors (q3), movable file storage system (compactor) (Q3) Qty : 2
Submission date: March 9, 2024 | **Location:** Chittorgarh, Rajasthan
Contact: Site Director, Rawatbhata Rajasthan Site P.O. – Anushakti, Via – Kota-323303 , Rajasthan

CONVEYOR

3 | Karnataka Power Corporation
Details: Tenders are invited for supply of 41,450 m - different size and ratings- nylon conveyor belt required for coal handling system of KPCL TTPs
Submission date: April 1, 2024 | **Location:** Bengaluru, Karnataka
Contact: Chief Engineer, NO.3, 2nd Floor, Office Of Cetd, Palace Road, Drugs Controllers Office Premises, Bangalore, Karnataka. Mob: 09141607897

4 | National Aluminium Company
Details: Tenders are invited for supply of heavy duty conveyor belt, rating-nn 800/5 (q3), heavy duty conveyor belt, rating-nn 1400/5 (q3), heavy duty conveyor belt, rating-nn 1250/5 (q3) qty : 2562
Submission date: March 11, 2024 | **Location:** Damanjodi, Odisha
Contact: Arbind Kumar Singh,Alumina Refinery Nalco, Damanjodi Odisha

5 | North Central Railway
Details: Tenders are invited for supply of special rubber pads of 240 mm width, 10 mm thick made of nylon conveyor belt of three-ply with coverthickness 5 mm minimum at top and 1.5 mm minimum at bottom confirming to is-1891 part-1 (latest) m-24 gradefor the use in 1:12 cm xing portion (10 nos. of total length 5,915 mm) as per drawing. tolerance of +/- 5 per cent is allowed
Submission date: April 1, 2024 | **Location:** Prayagraj, Uttar Pradesh
Contact: Principal Chief Materials Manager, Subedarganj, A-Block GPO Complex, INA, Prayagraj-211015, Uttar Pradesh

6 | North Central Railway
Details: Tenders are invited for supply of distributor conveyor belt type:el plasser part no.:64.08.3855 size:14150 x 650 x 10 mm
Submission date: April 25, 2024 | **Location:** Prayagraj, Uttar Pradesh
Contact: Principal Chief Materials Manager, Subedarganj, A-Block GPO Complex, INA, Prayagraj-211015, Uttar Pradesh

7 | West Bengal Power Development Corporation
Details: Tenders are invited for rate contract for jointing and repairing of conveyor belt and drum rubber lagging at coal handling plant, KTPS
Submission date: March 09, 2024 | **Location:** Purba Medinipur, West Bengal
Tender value (Rs): 16,830,732
Contact: General Manager (KTPS), Mecheda, Purba Medinipur-721137, West Bengal

CRANE

8 | Indian Coast Guard
Details: Tenders are invited for supply of hydraulic mobile crane as per IS 4573 (Q3) Qty : 3
Submission date: March 09, 2024 | **Location:** New Delhi, Delhi
Contact: Deputy Director, New Delhi, Delhi

9 | Punjab State Transmission Corporation
Details: Tenders are invited for procurement of three truck mounted hydraulic cranes I.E. loader with 5 tonne capacity for PSTCL
Submission date: March 11, 2024 | **Location:** Patiala, Punjab
Contact: Dy. Chief Engineer/TS (D), Patiala, Punjab. T: 0175-2207774, se-trd@pstcl.org

10 | Southern Railway
Details: Tenders are invited for supply of EOT crane 20 tonne capacity main hoist and auxillary hoist 5 tonne capacity
Submission date: March 13, 2024 | **Location:** Multiple, Tamil Nadu
Contact: Senior Materials Managers-LW, Perambur, Tamil Nadu

11 | Modern Coach Factory
Details: Tenders are invited for supply of prove out of EOT crane cap 03T/01T
Submission date: March 15, 2024
Location: Raebareli, Uttar Pradesh
Contact: Principal Chief Materials Manager, Raebareli, Uttar Pradesh

12 | Eastern Railway
Details: Tenders are invited for supply of installation, supply and commissioning of EOT crane capacity - 65 ton
Submission date: 10/04/2024 | **Location:** Kolkata, West Bengal
Contact: Principal Chief Materials Manager, Kolkata, West Bengal

13 | Eastern Railway
Details: Tenders are invited for supply, installation and commissioning of EOT crane 30 tonne (on turnkey basis) as perattached annexure. [warranty Period: 30 months after the date of delivery]
Submission date: March 15, 2024 | **Location:** Kolkata, West Bengal
Contact: Principal Chief Materials Manager, Kolkata, West Bengal

14 | Eastern Railway
Details: Tenders are invited for supply of procurement, installation supply and commissioning of eot crane, cap:- 20 tonne with 60 m angle type dsl and remote control
Submission date: March 15, 2024 | **Location:** Kolkata, West Bengal
Contact: Principal Chief Materials Manager, Kolkata, West Bengal

Earthmovers

15 | Indian Navy
Details: Tenders are invited for hiring of earthmoving equipment, material handling equipment, cranes (per hour basis) - earthmoving equipment; digger loader; upto 10 years.
Submission date: March 11, 2024 | **Location:** Ernakulam, Kerala
Contact: Ernakulam, Kerala

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Tata Hitachi Construction Machinery Company

Glimpses of the launch event of Tata Hitachi's EX 210LC Prime held at Vizag on 22nd Feb, 2024. The event was graced by our esteemed customers, senior management of Tata Hitachi and Sri Dhanalakshmi Auto Agencies, Tata Hitachi's authorised dealership.

JCB India Ltd

JCB India Limited today inaugurated its dealer, Mayank Equipment's new facility in Bikaner. Offering JCB India's full Product Portfolio, the newly inaugurated state-of-the-art facility is set to provide an unmatched customer experience in Bikaner and surrounding areas. The facility will have a trained and competent team for Sales, Service and Parts along with on-site support. Spread across 15,000 sq. ft, the facility features an integrated workshop with a three-bay workshop along with mobile service vans, a parts van.

Volvo Construction Equipment

Our Volvo ECR25 Electric has reached another milestone, exceeding 4,000 hours of operation at a Stena Recycling AB plant in southern Sweden in only 2 years. Our electric solutions are the perfect partner in waste and recycling applications, supporting our customers in their sustainability goals.

HD Hyundai Construction Equipment India

Glimpses from the IESC Certification Operator training programme on equipment maintenance and safety at Indore, Madhya Pradesh. 20 operators participated in the programme.

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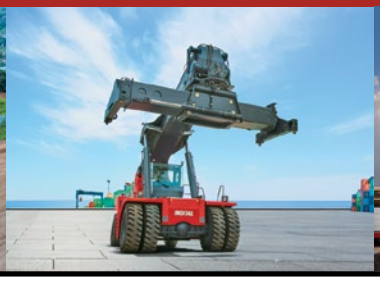

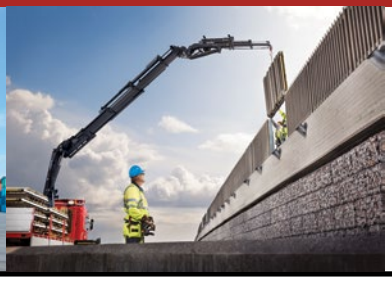

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