Mobile Cranes for Urban Infra Development

Mobile crane manufacturers are designing cranes that can address the execution complexities at urban development sites that have restricted space and a high population density. Some of the new products on offer are at the concept selling stage, reports. **P.P. Basistha.**

India's growing urban population is putting a massive demand on developing the cities' infrastructure such as water and sewage pipelines & treatment plants, electricity distribution utilities, seamless transportation by roads, bridges, flyovers, expressways, and an efficient mass transit metro network, etc. However, the construction of a modern, extremely divergent, urban infrastructure project involves numerous on-ground complexities, including project design, followed by its implementation. In view of this, contractors are gearing up for construction activities using advanced machines like mobile cranes that can perform well in urban sites, irrespective of the many challenges.

Says ***R.K. Pandey, Member (Projects), NHAI***, "Advanced mechanized solutions are preferred for critical jobs such as erection of steel and concrete precast girder sections, with speed and efficiency. In fact, NHAI has been advocating mechanization of all construction processes, and is promoting designs that can optimally bring down the cost of construction. For instance, the New Delhi-Mumbai corridor will be 200 kms shorter in alignment."

Similar views are concurred by senior project officials from Kolkata Municipal Corporation and Hoogly River Bridge Corporation, (HRBC). HRBC ownes and manages, the second Hoogly Bridge in Kolkata.

Avers ***Subhajit Chandra, Divisional Head-Liebherr Cranes India***, "The ability of our mobile cranes to successfully undertake urban infrastructure construction is a major consideration in the design of both our rough terrain and all-terrain cranes. This can be seen in the design of our EN 13000 that ensures high operational safety, efficiency and reliability, when working in urban projects. Our engineering expertise also ensures that operational cost is minimized to the extent possible."

Chandra informs that Liebherr's LTM 1250-5.1, 250-ton five axle, all-terrain mobile crane (successor to the globally successful LTM 1220-5.2 model), is designed to achieve maximum load capacity, making it one of the most powerful cranes in its class. Its load capacity has been increased by 15 -20 percent, compared to its predecessor, while its telescopic boom of 60 meters is of the same length. With lattice extensions, the maximum hook height has been increased by 90 to 110 meters. Liebherr has a wide range of lattice jibs for the LTM 1250-5.1. The 12.2 to 22 meters can be extended up to 36 meters with 7-meter sections. The folding jib is attached with 0 degrees and 45 degrees. The unique Variobase feature, like all our other all-terrain cranes, enables it to infinitely calculate the load configuration, despite the outriggers placed arbitrarily, allowing launch bridge girder or precast sections on constricted sites. Two different ballast radii of 5.58 meters and 4.78 meters adjust the ballast radius quickly and easily, so it does not have to carry extra counterweight while being transported to the work site, and thus reducing the cost of operations.

"The single engine of the crane consumes less fuel and needs minimal maintenance, supplemented by the new Ecomode functionality of the engines. Liebherr's

patented Liccon software sends signals to the electronic engine, which then automatically adjusts its RPM as per the lifting requirements at site. For instance, when the crane is idle while the lift plan is being prepared, that is, between the lifting cycles, the engine will adjust itself. This adds to the cost efficiency of the crane," says Chandra.

Liebherr heavy capacity cranes with super lift configuration like the LTM1750-9.1 the 800 Mt All terrain crane have been finding application in metro projects across India. Jobs include erection of station superstructure, lowering and lifting of sections of tunnel boring machines, etc. "Liebherr's design competence ensures a perfect marriage between the hydraulics, structure and load lifting capability. Our cranes also ensure maximum safety when working in urban or industrial infrastructure projects," he adds.

The German crane manufacturing company has been targeting its 60 Mtv LTR 1060, 100-ton, LTR 1100, and LTR 1220, 220-ton telescopic crawler cranes for urban infrastructure projects in India. Chandra informs that the cranes, have a telescopic boom and can be assembled between 3-4 hours, making them ready quickly for the jobs, once they are transported to the site. They can move easily with loads, which makes them ideal for deployment at casting yards, especially for fitting casted pier caps on piers. The LTR 1220 was deployed by contractor NCC for setting up pier caps weighing close to 80 tons in the entire section of the Nagpur Metro.

Sany is offering its compact 6-axle all-terrain crane for use in constricted urban sites. **Says Sanjay Saxena-Sr. VP & Business Unit Head - Heavy Equipment, Sany Heavy Industry India**, "Our SAC 3000S, 300-ton comes with a maximum boom length of 73 meters and maximum lifting height of 115 meters. Top capacity of this All terrain crane is 300 ton with base boom of 15.65 meters length and can operate the jib at 20 and 40 degrees. SAC 4000S, 400-ton comes with a maximum boom length of 70meters. Top capacity of this All terrain crane is 400 ton with base boom of 15.2 meters boom length. With 70-meter boom length, it can lift 17 tons @ 13 meters working radius. The superior lifting capabilities and customization to meet Indian Lifting requirement, with the longer boom configuration, makes the cranes suitable for metro construction jobs. These cranes have the latest safety features, a GPS monitoring system, an ultra-long boom for wide working radius, latest electronic & Hydraulic controls system."

Sany India has recently launched a 500-ton all-terrain crane for the Indian market, primarily for construction of flyovers, bridges, elevated metro lines & are designed to meet lifting requirement of U-girder. Sany also launched its new SCT600TB, 60-ton telescopic crawler crane for use in shipyards and warehouse construction and various indoor applications. The crane can also be used for erection of precast sections, setting up of RMC plants and pier caps, in elevated metro railway projects, and for laying water pipelines.

Sany's latest invention is the SCC 450 A, 45-ton crawler lattice boom crane with a specialized track, lifting and transportation system. The machine can undertake different jobs such as piling concreting,

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structural plant erection, etc. It has retractable features that are extended during work mode and retracted during transport. Standard safety features include an emergency stop button, load moment indicator for automatically detecting load weight, work radius and boom angle, and over-hoist protection of the main and auxiliary load hoist.

According to industry estimates, the market for all-terrain cranes of 100 tons and above, that hovered around 22 units during 2014 – 17, was expected to reach 30+ units by 2019, with 120, 150 and 350 tons (and beyond), showing indications of good demand owing to the road and metro projects.

While rough terrain cranes can be seen undertaking core erection jobs in project sections with long gestation periods, the lighter and medium capacity truck cranes and yard cranes are being used for erection of loads of commensurate nature. The cranes are also used as supporting cranes for assemblage of boom sections of crawler cranes or doing utility transportation jobs. Among these, the mobile all-terrain cranes remain the most preferred for urban infrastructure construction. This is because their lighter axle load of 12 tons makes them eligible for plying on roads with faster mobility, as compared to rough terrain cranes that have a heavier axle load. Moreover, the hydro pneumatic suspension, special chassis designed to take on dynamic loads, makes the cranes suitable for working on undulated sites. Above all, the standard all-steerable axles give the cranes a shorter turning radius, making them capable of quickly positioning themselves in tight urban sites.

ACE has recently launched its new Next Gen, multi activity NX 360, NXP 150 and NXT 150 cranes. The Next Gen NX series cranes have features like capability to do multifunction, meeting specific customer application combining innovation with utmost safety, front cabin that moves along with the load, fail-safe brakes with dual circuit for front and rear chassis, two parts chassis – front and the rear joined with pivot pins, and oscillations controlled by leaf springs, with lower center of gravity. These versatile cranes with advanced features, innovativeness and utmost safety can be used for various jobs such as loading, unloading, erection, shifting and placement of materials at various projects and construction sites such as metro and mono rail bridges, flyover constructions, industrial construction as in refineries, petrochemical plants, power plants, power transmission towers, etc.

Manish Mathur, Vice President-Marketing & Product Support, Action Construction Equipments says, “All the Next-gen cranes, except the smaller capacity 12T/14T, have a synchromesh gearbox like the one use in commercial vehicles; while our conventional pick n carry cranes have tractor transmission (sliding mesh/constant mesh gearbox). Synchromesh gear boxes are technically more superior and can be designed and developed to carry higher weights to enable higher reach and increased capacities in our Nextgen cranes, making them suitable for urban infrastructure where there is paucity of space, and also in industrial projects.”

He informs that the Next Gen cranes, including NX360°, NXT150 and NXP150 are multi-activity cranes. The NX360° is a pick n carry crane that can also do a slew operation. The NXP150 is for both material and men handling with a basket, and the NXT150 works as a crane cum forklift.

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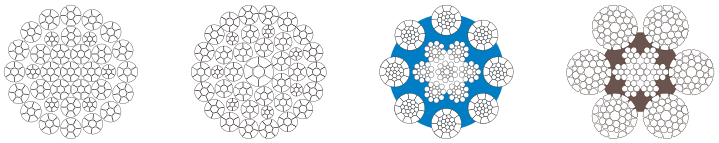

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Says **V.G. Sakthikumar, Managing Director, Schwing Stetter India**, "Our XCMG all-terrain cranes have the option of operating at asymmetric outrigger positions, thus allowing the crane to work at challenging sites where pre-existing structures do not allow enough space for placement of the cranes. XCMG tyre mounted cranes feature calibration-free technology elimination which helps to frequently calibrate load moment indicators that saves valuable time during assembly of the cranes at the job site."

He adds, "In XCMG cranes, safety systems consist of mechanical, electronic and hydraulic protection, safe load indicator with overload prevention, wind speed alarm, alarm for operation on uneven ground, swing/travel alarms etc., to ensure that the operator is well informed of the operating conditions and receives alarms in case of any impending unsafe working condition. Powl locks on winch, function lock out in operator cabin, hydraulic relief valves and non-return valves contribute to the safer operation of the crane. Tyre mounted cranes feature sliders to increase the contact area between the boom sections, thus improving overall integrity of the extended boom structure. Patented telescoping technology controls the boom extension and retraction sequences for smoother operation of the telescopic boom."

Schwing Stetter India offers XCMG's widest range of all-terrain cranes from 60 ton to 1600 ton capacities, incorporating the latest technologies, load chart calculation based on outrigger positions, single engine design, multi-layer safety systems, and so on. The all-terrain cranes feature high rated loads while meeting user expectations on safety, ease of handling at site with load tables featuring various counterweight combinations, within site transfer with counterweight to reduce set up time, thus saving cost. XCMG cranes' compact design, small turning radii, multiple driving modes like highway, site transfer, tight turning, crab walking along with high gradeability to negotiate gradients, makes them ideal for various Indian road conditions. All axle steering and switching option between two driving axle configurations puts the control in the user's hands to choose according to the road condition.

Widening its product portfolio, Schwing Stetter India is currently offering XCMG telescopic crawler cranes from 25 ton to 120 ton capacities. Says Shakti Kumar, "These cranes are a relatively niche segment in India as there is a slower adoption by the rental players. However, their application areas are set to grow, especially where challenges like space constraint and lift cycle time prevail. The telescopic boom does not require a dedicated space and set up time, while the crawler chassis allows the crane to move at a good pace, thus improving overall productivity."

XCMG all-terrain and telescopic crawler cranes are supported by Schwing Stetter India's network of 4 training centres, 30 sales and spares offices, 450 service engineers, an 10 service centers. The company promotes the products through its own marketing channels.

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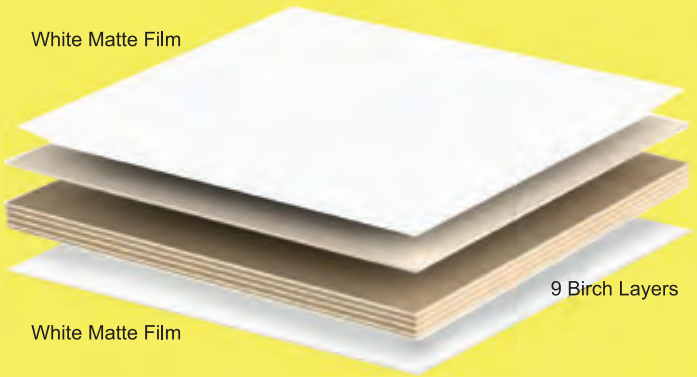
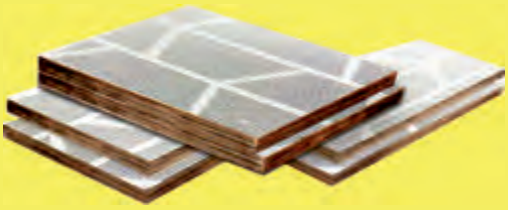


Alliance Birch Plywood is a combination of fine layers of birch veneers bonded with highly viscous phenolic resin which makes it highly flexible and overlaid with impregnated phenolic high scratch resistant film (minimum 120 GSM gose up to 400 GSM).

Composite Production Pallets

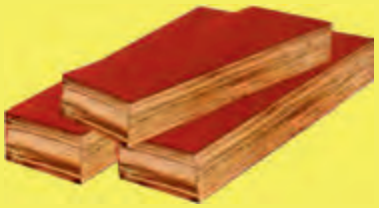
Pallets boards are made of high quality densified hardwood veneers impregnated with industrial grade thermosetting synthetic amino plastic resin. It is overlaid with 220 GSM pheolic impregnated film and 80 GSM issue paper on both side that makes it highly abrasion resistant. We manufactures synthetic film, Industrial fabric or Glass fabric pallets. Alliance pallets highly used for production of concrete blocks, Pavers, Concrete block machines

Alliance Super



Plywood for concrete shuttering works. Material is equilibrium moisture content of nor more than 20%.

Laminated Veneer Lumber



LVL belongs to the category of engineered wood. Its MOE & MOR results are very highest in its category. It is typically used for Beams, Joists, Frames, Components of roofs and doors.

Calibrated Shuttering Plywood

Alliance calibrated Film Face Shuttering Plywood is slightly different from traditional shuttering plywood. As it is manufactured with hardwood veneers suitability bonded with a phenolic resin and calibrated to achieve thickness difference of 0.20mm and laminated with high abrasion resistance impregnated film.

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TIL Limited is laying emphasis on its 200-300-ton imported all-terrain cranes as well as its rough terrain cranes manufactured in India for various infrastructure projects.

Says **Anil Bhatia, VP - Sales & Marketing, Tractors India**, "The Grove All-Terrain crane (GMK) scores high on mobility and gives overall high productivity and availability with its Megatrack™ feature – Grove`s patented independent suspension and all-wheel steer system. Each wheel is able to remain on the ground at all times, so that stresses and weight are not continually transferred between axles. While traditional suspension systems may raise the body of the crane, but it does not increase ground clearance, which is easily accomplished with Megatrack™, as the differential is attached to the base of the carrier. Suspension can be raised 6.5" [170 mm] or lowered 5" [130 mm] (both front/back and side to side) directly from the carrier cab, and automatically leveled for road travel. This feature also allows the use of a deeper carrier cross section which improves the overall torsional strength of the crane."

He further informs that the major strength of their all-terrain cranes is the advanced Megaform™ boom design that incorporates a U-shaped cross-section, which provides a natural cradling position for boom sections. Large wear pads provide superior boom alignment when telescoping and allow an excellent transition of weights between sections. This leads to an intrinsically stronger system. In addition to less weight, a larger cross section area can be used, giving greater lifting capacity at all radii.

The all-terrain cranes feature an all-wheel steer system, which, according to the company, gives the best steering geometry on or off highway, eliminating tire scrub and stresses on non-steering axles. Exceptional maneuverability allows even the largest fully rigged GMK to get as close to the lift as possible. Other systems, where one or more dead weight hanging axles remain fixed – lead to higher axle loads, driveline maintenance problems, increased ground pressure and tire wall stress. All-wheel steer enables a fully laden crane to distribute weight evenly across all axles. TIL manufactures rough terrain cranes of 20-to -80 tons and truck cranes of 30-80-ton under license from Grove.