

Construction Technologies Post Covid-19

May 21, 2020

The world of construction too will undergo a transformation with COVID-19. Construction equipment will now not only have to provide for safety features that it has incorporated so far, but automation would be now an essential feature of the fleet. Precast factories would serve the needs better than traditional concrete mixes on site. Safety gear, masks, sanitizers, infra-red thermometers, disinfectants would be part of the arsenal. Drone technology would become hugely necessary too.

Without technology, can we reach our goals?

Pratap Padode, Editor-in-Chief, Construction World and President, FIRST Construction Council, said on an opening note: "India is to be the fastest construction market in the world by 2030." He questioned: "But without technology, can we reach our goals?"

Padode went on to add, "Five years ago, India was ranked 185 out of 190 nations in construction permits. It has now improved." Having said that, he cited examples of the Bandra-Worli Sealink in Mumbai, which took 10 years to build and witnessed a cost overrun from Rs 4 billion to Rs 16 billion. Moving overseas, he highlighted that the Berlin Airport was under construction for nine years and to fix 66,500 errors. Speaking about the world construction industry, "\$10 trillion 90 per cent projects have been late or over budget," he exclaimed. So it's a global phenomenon. "But technology is here to stay, and we have to ensure that we can utilise technology to accelerate what we are intending to do," he avered. Technology is transforming the way buildings are designed; modular construction or even advanced technology like 3D printing, robotics, artificial intelligence, machine learning, etc, can deliver business benefits – be it designing sustainable houses or reimagining the infrastructure of entire cities in general.

Slow adoption of technology

The construction industry has been most reticent in adopting technology. Prime hurdles include education among skilled labour, on-the-job training, use of manual labour instead of machines, lack of enforceability...

Here, said DK Sen, Whole-time Director & Sr. Executive Vice President (Infrastructure), Larsen & Toubro, "Yes, the construction industry has been very hesitant in adopting new technologies for a long time. But as the industry grew, particularly for L&T, we double in terms of industry growth. Our entire construction business in terms of revenue stands at roughly about Rs 75,000 crore. So, it is a massive growth. And, it is difficult for us to do everything manually. We understood this 10 years back. Fortunately, we had a large exposure overseas in working for various international projects. So we understood how the world works and we have been actually importing technologies and machines for the last 10 years and using it in India. It has given us fantastic results. Our growth was particularly because of the machines we used. Having said that, it is not a replacement of manual labour. Manual labour is required, and is of very short supply today."

Speaking about technology, Sen added, "Technology-wise, we have understood that unless we connect all the machines with the Internet of Things (IoT), it will not give any fruitful purpose. So, we connect

excavators, graders, rollers, pavers, crushers, and connect them with IoT. This is done internally by us through L&T NxT and L&T Digital. At every point of time, we can monitor the productivity, the number of hours worked, a machine that was started but did not work productively; we can also understand the fuel consumption, any malpractice in the equipment – all this is to ensure project managers understand when something is going wrong.”

Besides, there is also a lot of wastage in construction. “So through the Cloud we actually track put 3D drawings into the system to ensure less wastage. It reduces manpower and actually gives more accuracy,” added Sen. Another thing he highlighted is the autonomous machines, which have still not come in, but will soon come in and see great benefits. “We are also using 3D printing. We have brought in about 4-5 3D printing machines, with which we are now actually printing toilet blocks or various independent units.” He believes the time for precast elements to be printed by 3D printing is also not far away. “A lot of work is also going on in design to suit and we are also doing geofencing of equipment. We are also using RFID. Besides, attendance is being recorded by biometric and not manually. Now with COVID, we are also using thermal scanning. So all these technologies really help in an extensive way and it is cheaper than conventional ways.”

COVID demands

Having a factory that has now restarted manufacturing construction equipment and speaking about the safety protocols being undertaken in the COVID scenario, Sandeep Singh, President, ICEMA and Managing Director, TATA-Hitachi Construction Machinery Company, said: his firm started preparing themselves before the lockdown was called off. “We gauged on the safety precautions needed in terms of man, machine and material, and started making a recipe. So we released these SOPs across the organisation about 10 days back, taking into account all the safety precautions, most important being for our people to maintain distance, cleanliness and disinfection. We have clearly defined roles and responsibilities of people across the organisation – from security to housekeeping every employee, and we can monitor these activities. We have shared these practices with our dealers and vendors as well.” He went on to add: “We did a trial round because we were allowed to open our plant partially during the lockdown, and the first thing we did was a pilot run for safety at both our plants. Prior to that, we had meetings with over dealers, vendors, vendor councils and shared safety standards. We followed government guidelines, we looked at best practices of other countries who have started before us. This is the most important activity each manufacturer needs to undertake to maintain safety standard, and then educate your employees and make them realise everyday on how important it is to maintain safety standards.”

Fuji Silvertch Concrete just restarted its operations. Added Managing Director Brijesh Shyam Shah, “It is important to educate our people regularly on all safety standards. We at Fuji Silvertch Concrete are following all safety standards. We are having all the places within our premises sanitized. In fact, we are having common areas like canteen and admin areas sanitized two to three times a day. Right now we are working with 30 per cent staff and are checking on the hygiene protocols required.” The company has an existing plant near Ahmedabad and is coming up with a second plant in Aurangabad.

Innovations and Jugaad

Padode opened this topic for discussion saying, “Generally, backhoe was not considered the lead equipment that would sell in a big way in a market like India, but somehow backhoe has become the best seller in India and is being used very innovatively.

Said Subodh Dixit, President & Executive Director, Shapoorji Pallonji E&C, “From the manufacturing and construction point of view, world over construction is lagging behind in adopting technologies for reasons be it clients, concept of cost, architectural details, skill sets availability, etc.

And, if you look from a major equipment point of view, he added, “Be it tower cranes or slip form climbing platforms or core walls or other equipment such as batching plants, tower cranes, etc – in terms of all these India is doing almost what the entire world is doing. The issue is how we are translating this integration of skilled labour or activity with the technology part. This combination is something we are struggling with.” He believes that in the last few years it was only construction companies trying to skill their people on sites. “Now the government is also taking initiatives. Also, several major construction companies have given two to three people in the pool for developing a curriculum for skill development. This is one part. Another part is off-site training, which has happened very well. And third is onsite training programme. Fortunately, all three are now getting dovetailed into each other.” So there is a good amount of work that has happened – from skill development to technology as the speed and productivity in the construction.

Coming to innovation, Dixit cites that nowadays everyone in India knows to operate a smart phone. So if a supervisor on site is able to capture details on his smart phone, which goes directly into the central system, help in productivity as well as daily progress report.

Here, Sameer Malhotra, CEO, Shriram Automall, on a light note added that the word jugaad has been given by India to the whole world. Speaking about innovation, he takes on the example of the backhoe loader in terms of its usage – even for excavation and compaction. “We even saw a tractor with a trolley being used for carrying away construction materials!” he exclaimed. “Most construction sites are using it.” He cites another example of international markets making use of different kind of cranes. While in India, in the 90s and early 20s we spoke about pick-n-carry cranes and mobile cranes. Soon, these become famous across the world. This is really jugaad, which came not from what we wanted to do but it is the need of the hour for the country. We do not have the payout at construction sites that can support world-class technologies all the time.

Speed in construction

“Did you know that India pays Rs 1 lakh crore every year because of delayed projects!” exclaimed Padode. We are already wasting so much in delayed projects. Hence, speed in construction is very important.”

Here, Shah has no doubt that modular construction and precast can help accelerate projects. Precast can be parallel work onsite and offsite. “So the developer is saved from allocating separate land area and providing the material and labour and other associated activities since the products are done off-site. There are many advantages of modular and precast technologies, but mainly it saves time and it assures better quality.” Fuji Silvertch Concrete has supplied to almost all repeated projects of Shapoorji Pallonji and L&T, as also the Motera Stadium.

Here, Sen of L&T, speaking about modular construction added that firm keeps on working on what more can be done on site at the backend. "Precast and modular construction is very good – be it in making a full bridge or even low-cost housing." He goes on to add that 3D printing machines is the future of construction. Benefits include productivity and timely completion.

Drones, video analytics and more

Drones are now being used in the COVID situation. In fact, some start-ups in India have actually come up with drones which can actually administer people and figure out the thermal imaging to check which people have got fever.

"Drones are like a blessing in our life!" exclaimed Sen. "It gives a real picture about the obstructions, the levels of differences, quality control for operational maintenance."

On BIM, added Dixit, it gives a three-dimensional view of the project from day one. "The fundamental advantage is you are able to see how the project is going to look along the way, you can see the pitfalls during the construction and what steps can be taken to overcome these." It also helps save wastage in projects; there is also a better control over cash flow management.

Speaking about video analytics and smart phones, Singh said, "When I go to our headquarters in Japan or to Europe or Australia, standard equipment are also fitted with intelligence. For example, AI is the standard fitment in the machines, drones are used to measure the size of the site, fleet management with advanced technology is common at all the sites. In India, most of our contractors are not yet adopting advanced technologies. For example, telematics in our equipment is being used only by some contractors here, while some don't use it. We have to remind them about the alert on their phone or email, and to ensure that their machines are properly maintained. So we are going on site and training them about these things. Such advanced technologies and equipment are used in other parts of the world and help reduce project time, cost and helps in efficiency.

Evidently, India needs to drive the economic activity through infrastructure and a major thrust on infrastructure projects lies in adopting technologies.

For more information, please visit: <https://www.roofindia.com/Home>