

BEING RESILIENT

USING
TECHNOLOGY
TO PROTECT
EPC EMPLOYEE
HEALTH

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Depending where you are in the world, the construction industry has fared differently during COVID-19. Some countries shut down completely, while others carried on with precautions in place. But as the industry comes out of lockdowns globally, large builders — classified as Engineering, Procurement, and Construction (EPC) companies — need to start shifting focus past immediate survival to long-term resilience. The coronavirus is not going away anytime soon. The EPC industry must strive to come out of the crisis stronger.

Germany was hard hit by COVID-19, but the construction industry is one of the bright spots, operating at about 80% going into July and August.¹ Germany's largest construction company, Hochtief, is moving forward with large infrastructure projects such as the new Rhine River bridge at Duisburg-Neuenkamp and will provide tunneling expertise for the new modernized power grid being built under London.

In New York City, nonessential construction sites opened again in early June after a three-month shutdown.² Construction started up again in the rest of New York state in May. Returning construction workers have to wear a face covering at all times, apply social distancing and get health screenings. Construction sites must provide more washing stations and do frequent cleaning and disinfection.

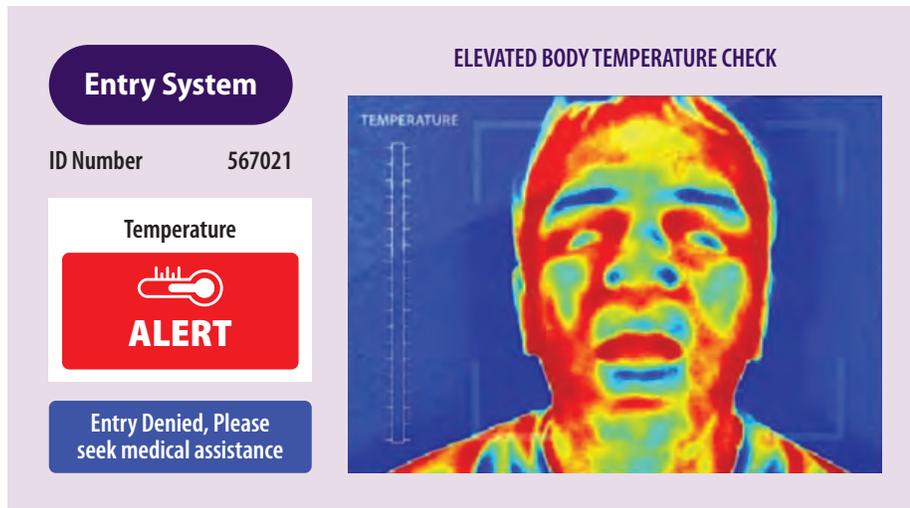
U.S. construction employment saw a record rebound in May — adding 464,000 jobs — the largest monthly increase in construction jobs since the U.S. government started tracking employment in 1939. It's a big change from April, when the U.S. had the largest month-over-month construction job loss.³

Industries worldwide are now past the pre-COVID stage of panic and the middle stage of transitioning people to remote work. Now, many companies are working to get on the cloud, digitize channels, and figure out analytics and insights. The dashboard

that used to be reviewed once a week is now an everyday crutch. The EPC industry wants to know where to automate and apply AI so it can be successful. At a strategic level, the construction industry will have to rethink its business model and learn how to empower the workforce to be successful. The construction industry is already well equipped to focus on health and safety. Keeping workers safe on the job is a top priority that's tracked daily. It's common to see signs on a construction site announcing the number of days without an accident. COVID-19 adds new challenges to the job of keeping construction workers healthy.

The current state of the industry creates several new opportunities. While many companies are cutting costs, those leading the EPC industry are also investing in innovation. Infrared camera temperature checks are quick, easy, and touchless. There are many ways innovative technology can make COVID-19 easier to manage on a construction site: Image analytics

Figure 1. AI can instantly read a thermal image and alert sick employees



Source: Infosys

immediately identify any worker not wearing a face mask. Autonomous construction vehicles can cut down on the number of workers at the job site, which makes it easier to apply social distancing. Continuous certification training is important; AI and VR can make that training virtual, while it still feels hands-on.

Tunnel temperature screening

Workers must get their temperatures checked when they arrive on the job site without close physical contact. If

a worker tests positive for COVID-19, it's important to trace and quarantine everyone they came into contact with. This seems like a tough task, but the right technology makes it simple.

A temperature check for all workers can be as simple as walking through a tunnel. It's portable and can be set up on the job site with an infrared camera. Computer-vision technology can detect workers with a fever. This technology works with AI to do a temperature screening without any close physical contact. It's already being used at Six Flags Entertainment Corp. at its amusement parks in the

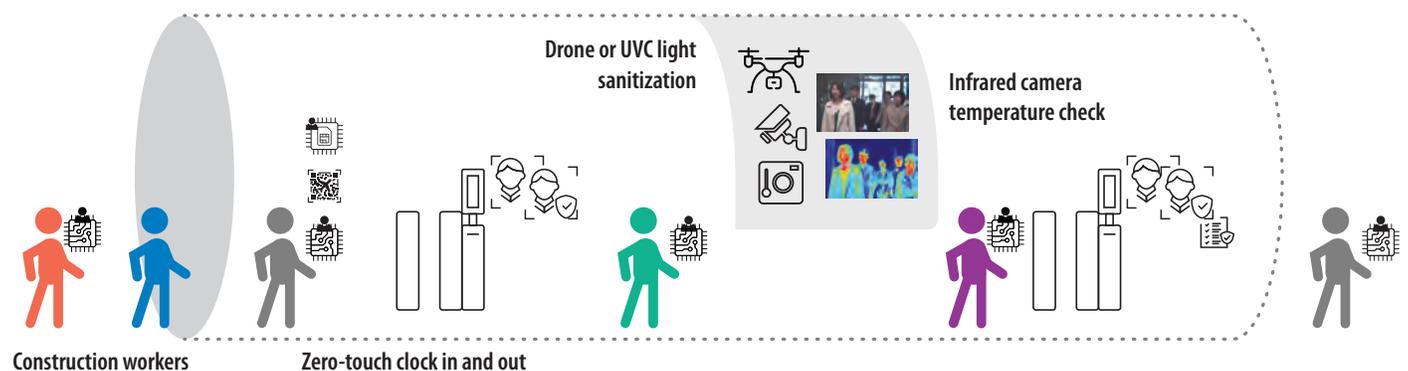
United States.⁴ In less than a minute, an employee can get the green light for good health. Worker arrival times can also be staggered to avoid too many people waiting to walk through the tunnel.

The tunnel can do more than just take temperatures. Facial recognition is a zero-touch way for employees to clock in and out. A drone or UVC light can sanitize the tunnel between workers. The results of the tunnel health check and timecard information can be stored in the cloud and automatically sent to selected supervisors.

Wearable temperature check

Another option for checking employee temperatures is one they can wear. Yes, the worker can wear a belt that constantly monitors their temperature and relays it back to a monitoring dashboard. This technique has been used before to monitor the health of fieldworkers during extreme heat. It would also work for COVID-19 temperature monitoring. The worker's belt uses a Bluetooth connection to transmit data to their mobile phone, which sends it to a centralized dashboard.

Figure 2. A health check tunnel is a quick, zero-touch way to check for fever



Source: Infosys

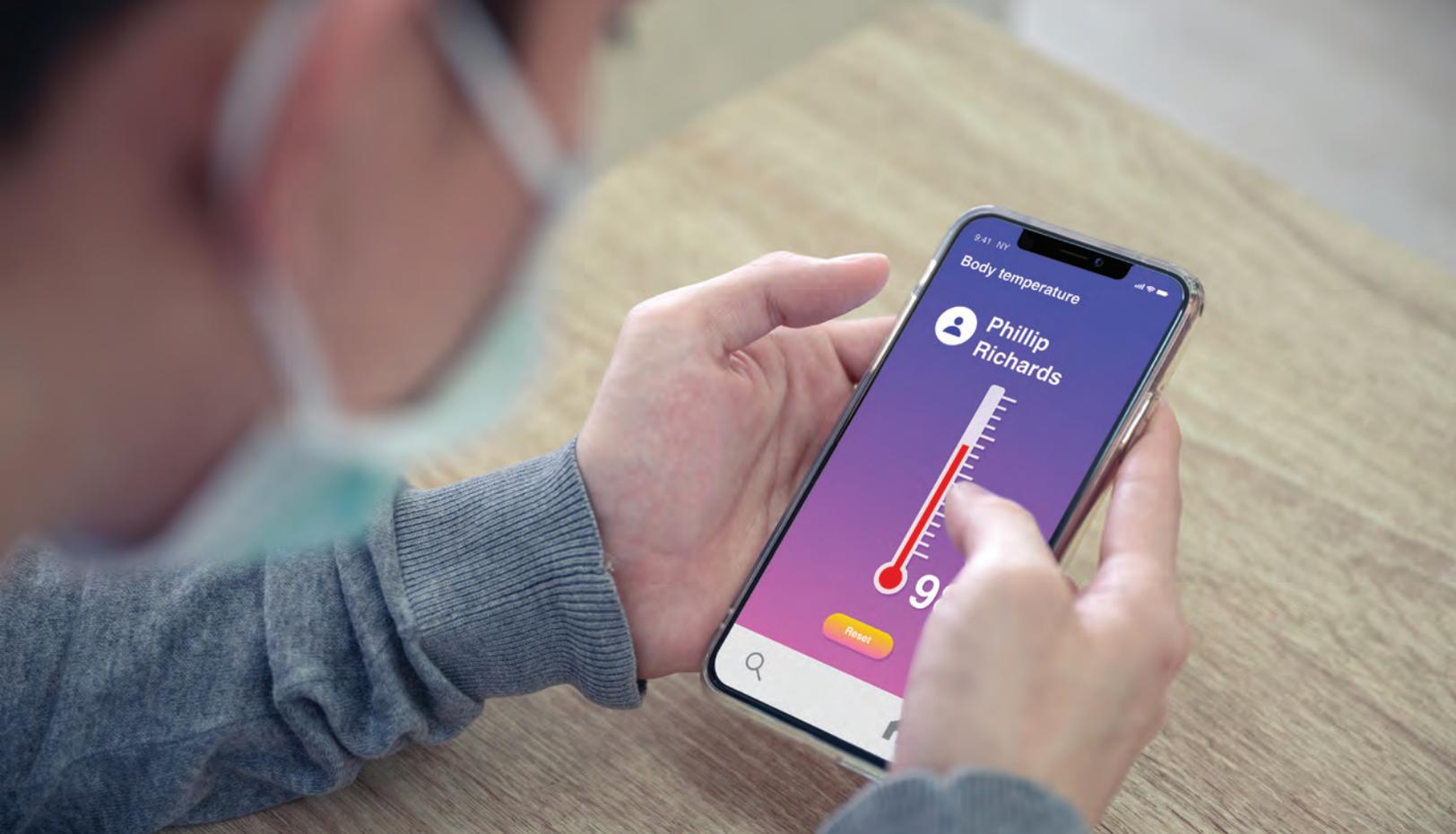
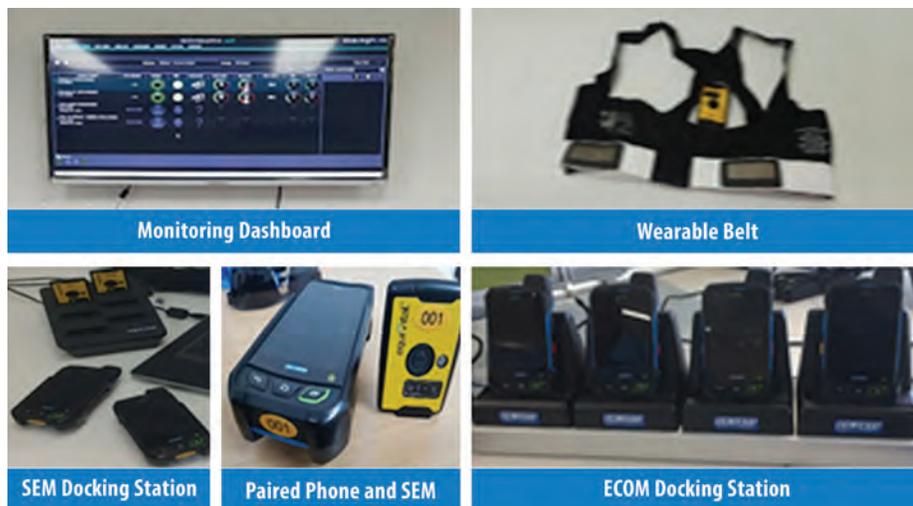


Figure 3. A way to constantly check fieldworker temperatures



Source: Infosys

Self-temperature checks

There's an app for that. Employees can use a smartphone app to check and record their own temperature before leaving home. Employers provide the digital thermometer that connects

to a smartphone. Employees commit to take their own temperature every day. Anyone with a fever is asked to stay home. This idea requires more trust in employees. For it to work, employees must remember to take their temperature every day.

Automation solutions

Automation can reduce the risk of spreading COVID-19 by reducing the number of workers on construction sites. Existing construction equipment can be retrofitted with sensors, AI, and cameras to become autonomous digging machines (Figure 4).

Caterpillar is focused on autonomous construction vehicles. It has developed technology called "Cat Command," which allows line-of-sight remote control operation of construction equipment from up to a quarter mile away.

Scaled Robotics is developing a robot that allows project managers to remotely monitor real-time progress. The robot uses a 360-degree camera and lidar unit to move autonomously and take pictures of its surroundings. The system then compares the pictures to a 3D model of the building, creating a map that shows real-time progress.



SYSTEM
RECOGNITION
IN PROGRESS ...

47%



ID : 87647526454

QUARANTINE : OK

COVID-19 TEST: OK

AUTHORIZATION : OK

WEARING A MASK : NO

Using autonomous vehicles for construction is still in its early days, but COVID-19 may be the push needed to make it more mainstream. People are needed at the construction site

to work with these vehicles, but together they can increase safety and productivity, while minimizing the kind of contact that can spread the virus.

Figure 4. Automation can reduce the spread of the virus



Source: Built Robotics

Contact tracing

Employers have to prepare for the worst-case scenario. It's likely someone on the job will get COVID-19. A contact-tracing app can be used to identify and trace workers who come into contact with an infected person. Cameras and Bluetooth radio beacons can track workers and detect if they're staying at least six feet away from one another. Employees who get too close to an infected person can be notified and told to self-isolate. Some may see this as an invasion of privacy, but it is a way technology can slow the spread of the coronavirus.

A contact-tracing app can help reduce the spread of COVID-19 and keep workers safe



Face-mask monitoring

In some parts of the world, face masks are mandatory. Image analytics can be used to identify workers who are not wearing their face masks. Cameras on the construction site can use artificial intelligence to alert supervisors if workers are not wearing their masks. Those intelligent cameras can also tell if employees are too close to one another and identify who would be at risk if someone came down with COVID-19. No personal data is saved by these solutions.

Virtual training

Certification training is an important part of the EPC industry, even for long-term employees. COVID-19 concerns mean training must be remote. In construction, much of the training is touch and feel. Virtual reality can bring that into field training done

from home. There's already a skilled labor shortage in the construction industry. Staffing job sites with talent was difficult before COVID-19. Now travel restrictions are making it even harder. The construction industry needs a training solution. Virtual reality is a way to provide that hands-on, first-person training without the risk of contracting COVID-19. Inexperience on a construction site can be deadly. Falls cause 42% of construction deaths, 20% of which happen during the employee's first two months on the job.⁵ VR training provides valuable experience working in a dangerous environment where nothing can physically hurt the employee.

Virtual reality provides training that feels hands-on, without any physical contact

Real-time interactive VR tricks the mind into believing the body is physically at a job site. The human brain can't tell the difference between a realistic VR experience and a real-life experience. The sensory memory of the brain helps people think about risky situations differently in the future. This helps people avoid those risky situations in real life. Swedish construction company Skanska developed its own VR training solution in 2017 using a virtual construction site with story elements inside.⁶ By creating emotions, putting users at risk, and making it feel real, trainees live the experience and have a sensory memory of it. This leads to less risky behavior in construction environments. Virtual reality goes a step further than just giving someone the knowledge. When that person experiences a situation repeatedly, their behavior should change. The power of VR can be used to tap into memory systems and change behaviors.

Moving forward

Necessity is the mother of all digital innovations. No business is 100% resilient, but businesses fortified with some sort of digital capability are more resilient than those that are not. The EPC industry has to prepare for the next phase of the new normal.

There's a huge opportunity to help construction companies empower their employees.

The EPC industry contributes more than seven trillion dollars to the worldwide economy.⁷ Demand will certainly decrease as government and corporate spending slows in the face of economic uncertainty, supply chain

disruption, and productivity slow down. The duration and severity of the crisis are unclear, but technology can give employees a safe work environment. The EPC industry faces many challenges, but by making some smart moves now, the industry can emerge leaner and stronger on the other side of this crisis.



References

1. [German Industry Optimistic in Face of COVID as Border Restrictions Are Set to Loosen](#), Michael Dumiak, June 18, 2020, ENR.
2. [New York City Construction Sites, Now Open, Adjust to New Realities](#), Eydie Cubarrubia and Debra K. Rubin, June 9, 2020, ENR.
3. [Construction employment sees record rebound in May](#), Jenn Goodman, June 8, 2020, Construction Dive
4. [Six Flags Announces Extensive New Safety Measures for Reopening Parks](#), May 26, 2020, sixflags.com
5. [Applications of Virtual Reality Training to Boost Employee Safety](#), Sage Larsen, June 4, 2020, PixoVR.com
6. [Virtual training, real benefits](#), April 27, 2017, Skanska.com
7. [Projected value of engineering, procurement and construction \(EPC\) market worldwide in 2019, by region](#), T. Wang, July 31, 2019, Statista

Authors

Mitrankur Majumdar

VP – Regional Head, Services
mitrankurm@infosys.com

Dr. Arunkumar Ranganathan

AVP – Head of DCG, Energy, Utilities & Services
arunk_ranganathan@infosys.com

Jagath Jeevan Nari

Senior Consultant - EPC Services
jagathjeevan.nari@infosys.com

Christine Calhoun

Senior Consultant – Infosys Knowledge Institute
christine.calhoun@infosys.com

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