How contractors can create safer, healthier workplaces

Technological solutions and the right business partner can help contractors and engineers maintain highest standards for sustainable operations and user health and wellness.

Like so many industries, construction has been severely impacted by the disruption caused by the global pandemic that turned everyone's world upside-down. Even though many construction jobs were deemed essential services in various countries, and some sites have reopened following lockdowns, it has become clear that the industry must embrace new precautions and practices as economies continue to adjust to an era of heightened health protocols. These are now an essential element in the green building trend.

Project managers face the need to get the job done but also to use as few people as possible to mitigate the risk of viral infection. Under social distancing rules, it's thought that up to 60 percent of workers can safely return to worksites, but this means productivity may fall by 30 to 40 percent, and it will take longer to bring projects to completion[1], according to engineering company Arcadis. Contractors have to work with scaled-down teams plus automation to create buildings that are this new shade of green. That means providing an environment of clean surfaces and well-ventilated airflows for building occupants and guests, as well as carbon-neutral operations.

Contractors need a trusted business partner with broad expertise and robust solutions

It also means that the need for a trusted business partner with broad expertise and a toolbox of robust solutions has never been more critical to sustainable and safe operations.

Smarter, slimmer construction

The construction industry is the largest in the world, representing 13 percent of global GDP, but according to a 2020 study by McKinsey & Company[2] productivity has only grown one percent per year for the past two decades. In a survey of 400 global industry leaders, the consulting group found that two-thirds of respondents believe the public health crisis that arose in 2020 will speed up transformation already happening in the industry, including heightened emphasis on sustainability, new materials, and digitization. Digital transformation is one of the most important ways the industry is changing. Stakeholders have more widely adopted building information modeling (BIM), according to a World Economic Forum blog post by Matt Howell-Jones, an Arcadis partner, and Fanyu Lin, CEO of Fluxus LLC[3]. For instance, when contractors and other people involved in a housing project could not meet in person, work continued in BIM virtual environments. This is part of a trend toward slimmed-down work teams and increased use of digital technology and automation.

Digital transformation is supporting the trend toward slimmed-down work teams and increased use of automated solutions

Meanwhile, digital twins—or virtual clones—of buildings are being used to model the number of people in building areas at different times of the day, as well as elevator and air conditioning specs and usage, in order to ensure that electricity is used as efficiently as possible. Through these virtual environments, building managers and contractors can not only detect inefficiencies in the building, they can also predict when equipment will require maintenance or replacement, making structures less prone to failure.

The construction business has also been driven to quickly rethink processes that have not changed in decades. Construction equipment makers are now following the lead from their counterparts in the mining industry

to automate vehicles and other elements of operations. In various countries, drones are surveying construction sites to help build 3D digital project models. Trucks, bulldozers and excavators are being equipped with artificial intelligence systems. Smart machines such as drywall finishing robots are being deployed along with powered exoskeleton suits for workers. The benefits include the elimination of tedious tasks that can cause debilitating injury while cutting time to completion as machines toil overnight in addition to humans that work during the day. That makes even more sense given the need to[4].

"Contractors use a lot of people and a lot of layers," said Michael Owen, a Tokyo-based real estate consultant and a member of the Japanese Cabinet Office's Future City Promotion Council. "How do you ensure your working teams are healthy? How many people can you reduce on site with automated systems, eliminating inefficiencies?" The correct answers to these questions, and others, are the keys to sustainability.

According to Owen, contractors in Japan have responded to pandemic stresses by slimming teams and forming redundant units. If members of one team are out for some reason, the entire team may be removed from the project while another completely intact team steps in to take its place.

"It comes down to redundancies," Owen said. "They have backup plans and integrate automation into the buildings themselves. Some contractors go to a 40-story building and dismantle it floor by floor with a robotic system, so neighbors don't have to miss a day of work due to dynamiting. That automation can be applied throughout the world[5]," he said.

Greener, more efficient solutions

If the construction industry can evolve, it stands to improve productivity by 50 to 60 percent and unlock $1.6 trillion per year in incremental global value, according to a 2017 report by McKinsey & Company[6]. An important part of improving productivity is choosing solutions that are smart, healthy and sustainable. According to Michael Owen, the priorities now are health and wellness, better ventilation, green buildings, and sustainability. "All these things have to be built into the building itself combined with the use of alternative energies because the keyword now is 'carbon-neutral,' " he said.

Japan leads the industry in building sustainability because its architects and engineers have had to grapple with the constant threat of earthquakes. Modern skyscrapers and housing complexes in Japanese cities are built to withstand the strongest earthquakes, but they're also equipped with backup and green energy generators to make them resilient and sustainable. Post-construction maintenance is another key characteristic of Japanese construction to help ensure that building infrastructure such as elevators, HVAC systems and utilities are running 24/7.

Immediate priorities are health and wellness, better ventilation, green buildings, and sustainability

"The standards in Japan are higher than overseas due to the Japanese dedication to quality," said Owen. "The Japanese are in a tougher situation with earthquakes happening here all the time, and so there's a lot more emphasis on adapting to that so it doesn't negatively impact lives. There are systems going through tunnels and bridges inspecting the infrastructure every day in Japan. The bullet train lines have special inspection trains, checking them every day. These are things that the Japanese have never cut corners on, and because of that, they're ahead," he said.

Right partner, right tools

From preventive maintenance to intelligent ventilation, Mitsubishi Electric Building Solutions has a suite of offerings that can be tailored to the specific needs of any contractor. These are state-of-the-art solutions applicable even to the newest variants on smart buildings. The pressing and impending needs of individual buildings can be served by Mitsubishi Electric's experience with best practices and technologies applied to a variety of markets worldwide.

Artificial intelligence, big data and remote maintenance are also helping to reduce congestion in buildings. In 2019, Mitsubishi Electric launched the M's BRIDGE service markets in Asia[7], which applies the company's expertise in IoT and its Maisart AI platform. M's BRIDGE features 24/7 remote monitoring of elevator operations and automatic detection of failures, as well as remote analysis of failure data and identification of causes to facilitate rapid repairs. This contributes to improved safety, peace of mind and convenience for building users.

Ventilation has become a key focus in the fight against airborne pathogens. Mitsubishi Electric offers a complete package of ventilation, air conditioning, and lighting with ventilation technology that works together seamlessly [8]. This solution reassures building users that

Indoor environments must be healthy for users and sustainable for building owners

their work environment is safe. Also incorporated is a special duct ventilator, released in November 2020, that is the industry's first with a built-in CO_2 sensor. It detects how crowded a given space is and automatically adjusts the ventilation to ensure that CO_2 levels do not get too high. While it enhances the amount of ventilation only when people are present, it limits the inefficient use of electricity by air conditioning—one of the largest expenses for commercial facilities.

The duct ventilator works with Mitsubishi Electric's Lossnay ventilation system, which has been developed and refined over the past three decades. Lossnay has perfected the recovery of waste energy. The units reduce overall energy costs by extracting stale air and then recovering the heating or cooling energy to either warm or cool incoming fresh air. By utilizing this energy, the Lossnay can save up to 30 percent on initial capital costs of heating and cooling[9]. Lossnay is part of a suite of HVAC solutions from Mitsubishi Electric designed to maximize sustainability.

Flexibility, changes for the better

A reliable supplier-partner that's renowned for leadership, collaboration, and flexibility, Mitsubishi Electric Building Solutions can provide mission-critical information and support for contractors and engineers in need of timely knowledge on building and occupancy trends in order to predict costs, mitigate risks, and remain profitable. This will not change, nor will the need to implement technologies to reinforce building safety and longevity. Conveying the significance of these solutions to clients and partners is essential.

From smart building access and monitoring to indoor air quality management and much more, Mitsubishi Electric offers real-world solutions that contractors, engineers and other building industry stakeholders need to plan and construct environments that are both healthy for occupants and users and sustainable for building owners and operators.

References

(1). WORLD ECONOMIC FORUM: "Here's How Smart Construction Could Transform Home-building After COVID-19" https://www.weforum.org/agenda/2020/08/here-s-how-smart-construction-could-transform-home-building-after-covid-19/

(2). McKinsey & Company: "The Next Normal in Construction" https://www.mckinsey.com/~/media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/The%20next%20normal%20in%20construction/The-next-normal-in-construction.pdf

(3). WORLD ECONOMIC FORUM: "Here's How Smart Construction Could Transform Home-building After COVID-19" https://www.weforum.org/agenda/2020/08/here-s-how-smart-construction-could-transform-home-building-after-covid-19/

(4). Consumer News and Business Channel: "How Autonomous Robots are Changing Construction" https://www.cnbc.com/2020/11/30/how-autonomous-robots-by-are-changing-construction.html

(5). December 2020 online interview with Michael Owen, CEO of Transpacific Enterprises, a Tokyo-based consultancy that develops PR strategies for real estate developers, investors, and government officials

(6). McKinsey & Company: "Reinventing Construction through a Productivity Revolution" https://www.mckinsey.com/business-functions/operations/our-insights/reinventing-construction-through-a-productivity-revolution

(7). Mitsubishi Electric Corporation: "Mitsubishi Electric and Mitsubishi Electric Building Techno-Service Jointly to Launch M's BRIDGE™ Global Remote-maintenance Service for Elevators" https://www.mitsubishielectric.com/news/2019/pdf/0926-b.pdf

(8). Mitsubishi Electric Corporation: "Changing Closed Spaces into Places of Comfort, Mitsubishi Electric's New Normal Solution" https://www.mitsubishielectric.co.jp/me/convention/ceatec2020/en/life1/

(9). Mitsubishi Electric Corporation: "Lossnay Energy Recovery Systems" https://www.mitsubishielectric.com.au/2096.htm